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ABSTRACT

The skills and education/training implications of the development of electronic commerce in the United Kingdom's retail industry and its associated supply chain were examined. The major data collection activities were as follows: a literature review; consultation with leading academics and advisers; an e-mail-based call for information from retailers involved in electronic commerce; and interviews with retailing organizations involved in electronic commerce. The following were among the skill needs identified: (1) management (project, information and communications technology (ICT), logistics, supply chain, and contracting and partnership management); (2) technical skills centering on the ability to design, build, and run ICT systems; (3) online marketing and customer service skills; and (4) generic business skills, including entrepreneurship, creative thinking, and problem-solving skills and greater levels of understanding of ICT and its potential benefits for the retail industry. Changes in the demand for lower-level skills as a result of electronic commerce appeared to be more incremental than fundamental and center on the need for more widespread computer literacy and higher levels of customer service. However, the demand for higher-level skills was far outstripping the supply. Five areas for further research were identified. (A 35-item bibliography and list of research participants are appended.) (MN)

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The Skills Implications of Electronic Retailing

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Studies

The Skills Implications of Electronic Retailing

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Executive Summary

Numerous forecasts predict that electronic commerce in the retail sector (e-retailing) has the potential for significant growth and could revolutionise the process of shopping. However, there is concern that this potential will not be realised if there are insufficient people with the skills necessary to exploit the emerging opportunities.

The study

In March 2000, the Department of Trade and Industry (DTI) commissioned the Institute for Employment Studies (IES) to assess the education and skills needs of the retailing sector over the next three to five years, arising from the development of e-commerce over the Internet, digital television and other media platforms. The study involved an examination of existing research in the area and a series of expert interviews.

What is e-retailing?

E-commerce has been defined as:

> *'(the) purchases of goods, services or other financial transactions in which the interactive process is mediated by information or digital technology at both locationally separate ends of the interchange'.* (CRIC 1999, p. 5).

The above view recognises that e-commerce is a **transaction process** that not only incorporates actual trade between buyers and sellers, but also encompasses the processes that make such trade possible. These processes are generic to all forms of e-commerce and particularly apply to e-retailing.

In addition to recognising e-retailing as a transaction process, it is also important to acknowledge its impact on **supply chain relationships** and **business design**. In short, e-retailing involves the use of digital technology to manage the flows of **information**, **products** and **payment** between consumers and retailers, and retailers and their suppliers.

Although it is difficult to find agreement on the size of the e-retailing market in the UK, many commentators agree that it has

substantial potential. There are several reasons why e-retailing is becoming popular. These include:

- expansion of choice
- reduction in operating costs
- improved efficiency in transactions
- reduced costs in distribution.

However, despite these benefits, its continued success is contingent upon its ability to overcome a number of barriers, including:

- limits in technology
- consumer resistance
- business constraints.

On the last point, one business constraint that has been identified as a possible inhibitor to the adoption of the new technology commerce is a shortage of people with the right skills.

Skill needs

A range of skill needs associated with the development of e-retailing has been identified:

- Management is a critical area of skill need; in particular:
  - project management
  - ICT management
  - logistics management
  - supply chain management, and
  - contracting and partnership management.
- In addition there was a range of technical skills required which centred on the ability to design, build and run ICT systems. Here the demand appeared to be threefold:
  - people with the necessary depth (*eg* in computer languages, database construction or interactive design)
  - people with the necessary breadth to see and forge the links with other elements of the retailers' systems and provide and maintain integrated solutions
  - people with sufficient understanding of both retailing in general, and the organisational context within which they worked, so as to be able to design and deliver appropriate solutions.
- Other technical skills were also identified including:

- on-line marketing skills – to exploit the customer information collected
- customer service skills – particularly at the fulfilment end, which could be the only physical contact between the customer and the retailer.

- Underpinning the above particular skill requirements were some generic skill requirements at all points of the business, including:
  - 'entrepreneurship' or 'thinking outside the box', and includes the ability to develop creative yet practical solutions to problems, coupled with positive 'can do' attitudes and a high level of personal commitment.
  - greater levels of understanding at all levels about ICT and the potential it offers the retail industry; while at the same time people with technical ICT and other skills were expected to have a much better and broader understanding of business issues in general, and those prevailing in retailing in particular.

Future demand for skills

It is difficult to predict the extent to which e-retailing will grow over the next three to five years and most commentators talk in terms of possible scenarios such as:

- **high, universal growth** – in which e-retailing fairly rapidly becomes an important and generally accepted distribution channel
- **medium, differentiated growth** – in which e-retailing is an important retail channel for some groups of the population
- **low, niche growth** – in which e-retailing is essentially a niche distribution channel, important only in a fairly narrow range of product markets.

The nature of the skill needs of e-retailing vary to an extent with the various growth scenarios, but not as much as both their incidence and their impact. The main conclusions from this analysis are that as e-retailing grows as a proportion of total retail sales:

- demand for ICT and management skills rises rapidly, but begins to tail off under the high growth scenario, as most retailers develop new e-retailing systems – *ie* the most important skills gaps are likely to be in the near-term rather than the long-term
- demand for lower level operational staff, *eg* on the fulfilment side, rises as growth rates rise – *ie* any skills gaps in this area are likely to appear in the medium to longer term

- under each scenario the demand for customer service skills increases although its precise character may change, and this is, therefore, both an immediate and future skills gap
- furthermore, under each scenario there is a demand for widespread computer literacy, which may be hard to meet if the sector becomes more dependent on an ageing workforce.

In terms of employment, conventional forecasts predict a slight rise in overall retail employment, *ie* around 50,000 people, although they may underestimate the impact of the development of e-commerce. We estimate that the retail sector will have to recruit at least between 5,000 and 10,000 more specialist IT staff – approaching half as many again as are currently employed. In a competitive labour market, it is likely that the sector will face problems attracting recruits of sufficient quality.

In addition, under the higher growth scenarios, the sector will become even more dependent on external suppliers of IT services, thus creating a knock-on recruitment requirement. Although we are unable to estimate the proportion of the employment growth in the wider IT sector that can be attributed to e-retail, it is likely to be a significant element of the 350,000 to 800,000 IT people that are estimated to be required in the next five years.

Meeting the demand

The main responses to the growing demand for e-retail skills:

- *Employers* are largely responding by upping rewards and outsourcing major elements of the process. Training is being offered, but as a recruitment and retention inducement rather than as a response to shortages.
- *Software suppliers* are developing productivity tools and other specialist software in an attempt to reduce the skills requirements of deploying e-retail solutions. At the same time they are providing proprietary training and certification covering the latest software and its functions.
- *Higher education institutions* are attempting to broaden the curriculum to include the non-technical skills considered vital by employers. On the other hand, they are almost inevitably lagging behind the fast-moving cutting edge of e-retail software developments.
- *The National Training Organisations (NTOs)* are working more closely together and trying to map the area and ensure that accurate and up-to-date skills requirements is reaching the education and training sectors. The NTOs are also looking at mechanisms for incorporating software providers' proprietary training in the NVQ and training funding systems.

Conclusion

E-commerce has imposed new skills requirements on the retail sector. Providing an online retail solution demands new skills at every stage of the process. Supply and demand factors are influencing the way that the retail sector is able to deal with the new skills demands.

- Changes in the demand for lower-level skills as a result of e-retail appear to be more incremental rather than fundamental, and centre on the need for more widespread computer literacy, and higher levels of customer service. The sector may have to rely on higher levels of in-work training to ensure these requirements are met.
- The demand for higher level skills, however, is far outstripping the supply. This is partly because the output of the education system is not 'job-ready', in terms of the skills required by the new technology underpinning e-commerce. But it is also partly because the retail sector itself is unable to attract young people with these relevant skills particularly as the numbers available dwindle and competition from other sectors intensifies.
- Addressing some of the problems the sector faces requires leaders of the sector to have a vision about the potential for e-commerce to deliver new business solutions; and be prepared to take risks about the rapid pace of development of the 'immature' technology which underpins online retailing.

The study has identified new areas for further research, including:

- quantifying skill needs across the retail sector as a whole
- assessing the additional skills needed to compete, not only in the UK market, but globally
- qualitative work to understand the key management skills required for successful participation in e-retailing
- a comprehensive assessment of the relationship between retailing and education, and what changes are required to make any partnership work
- an assessment of the extent to which computer literacy is addressed through the life stages of individuals, from primary school, through to tertiary education and beyond.

1. Introduction

1.1 Background

Since the late 1960s, large scale corporations have conducted business transactions with the assistance of digital technology. Business-to-business trade has been aided by Electronic Data Interchange (EDI) while banks have established dedicated networks for electronic fund transfers (EFT). The last few years have witnessed the expansion of business-to-consumer related electronic commerce (e-commerce). This trade has predominantly been facilitated by the growth of the Internet and the development of the 'World Wide Web'. Today, developments in Internet-based technology, together with the emergence of alternative platforms, including mobile technology[1] and digital interactive television, are expanding the opportunities for the new commerce even further.

Agreement on the size and scope of e-commerce is very difficult to obtain. Estimates of the value of the UK's e-commerce market in 1999 vary markedly from £118m (Datamonitor 1998 data in Morgan Stanley Dean Witter, 1999) to £3.2bn (NOP Research Group, 2000). Despite disagreement of its current size, the potential of e-commerce is substantial. In a recent survey, ten per cent of UK households had made purchases using the Internet, while 40 per cent owned personal computers and 29 per cent were online (Ernst & Young, 2000). Nearly nine out of ten of these buyers spent more in the current year than the previous one and many commentators predict a growth in their spending over the next three years. In addition, around three-quarters of current non-buyers and low frequency buyers suggested that they would make purchases in the forthcoming year (Ernst & Young, 2000). Another survey predicts that by the end of the year 2000, the sales value of business-to-consumer e-commerce will exceed £10 billion (NOP Research Group, 2000).[2] Other estimates yet suggest the

[1] For example, the mobile Internet ('Wireless Application Protocol', WAP) technology and by 2002 'third generation' (G3) telecommunications technology. A detailed review of the developments in different platform technologies is presented in *Performance and Innovation Unit Report* (1999).

[2] Datamonitor estimates that the value of electronic commerce will reach £280m in 2000 (Morgan Stanley Dean Witter, 1999).

value of e-commerce could be even higher, and would rise to almost four per cent of GDP by 2002 (Spectrum Strategy Consultants, 1999).

What all this suggests is that although the current value of e-commerce transactions is small, relative to the size of the economy, it will continue to grow at a very high rate. But it is the long-term benefit of e-commerce that is even more significant. It will enable the development of new business processes and generate new business models. At the very least, it is acting as a catalyst for both Internet-based companies and the traditional producers of goods and services to transform their business processes into e-commerce processes, in an effort to lower costs, improve customer services, and increase productivity (US Department of Commerce, 1999). Businesses that are able to do this successfully would be able to take advantage of the global market which is opening up with the growth in Internet access.[1]

The UK is perceived to have several advantages which it could use in exploiting e-commerce. These include the English language, which is used on more than 80 per cent of Websites worldwide; a liberalised telecommunications market; the early deployment of new technologies; strength in broadcasting and content industries. However, there is concern that this potential will not be realised if there are insufficient people with the skills necessary to exploit the emerging opportunities. The Department of trade and Industry (DTI) therefore commissioned the Institute for Employment Studies (IES), in March 2000, to assess the education and skills needs of the retailing sector, arising from the development of e-commerce over the Internet, digital television and other media platforms.

1.2 Objectives

The purpose of this study is to identify the skills implications of the development of e-commerce on the retail industry, and its associated supply chain. In particular it sets out to:

- map out the principal industries that the retail sector, together with its associated supply chain, need to collaborate with if they are to compete effectively in the new global electronic market place
- identify the skills required in the retail sector and in the supply chain to meet the expected growth in e-commerce in the UK, via the existing Internet and the other platforms which are currently under development or already coming on stream, and

[1] Nua, an Internet strategy firm estimates that about 171 million people across the globe had access to the Internet by May 1999 (http://www.nua.ie/surveys).

- assess the extent to which skill needs are being met through the education system and other vocational training activities.

In addition, this study considers whether there are gaps in the research currently available on this subject and, in so doing, develops recommendations for further research. It is expected that the evidence produced here will contribute to ensuring that the retail sector and related industries attract the skilled people needed to maintain the sector's contribution to the UK economy, even as retailing adapts to the changing business environment.

1.3 Methodology

The research methodology consisted of both secondary analysis and fieldwork. The four main components were:

- collection and review of existing literature
- consultation with leading academics and advisors
- an e-mail based call for information from retailers involved in electronic commerce
- interviews with retailing organisations involved in electronic commerce.

1.3.1 Desk based study

The starting point of this research was a review of existing literature on electronic commerce. The aims of the review were threefold. First, the review sought to identify any existing data and literature on the skills impact of electronic commerce. Casting the net further afield, the second aim was to develop an understanding of the changing business context, and skills implications therein, of this new environment. Thirdly, the review aimed to identify individuals and organisations that could potentially inform this study. A bibliography of some of the key sources cited is included in Appendix 1.

1.3.2 Fieldwork

The fieldwork began with a preliminary round of telephone interviews with 'key' players in academia and industry. The purpose of these interviews was to explore a number of working hypotheses, developed from the literature, regarding the areas in which e-commerce may have an impact on the demand for skills. From the early round of consultation it was possible to develop a semi-structured framework for a series of face-to-face and telephone interviews with retailers, representatives from national training organisations, Internet consultants and other e-commerce related businesses. A total of 29 interviews were conducted. A list

of the key players and organisations interviewed is included in Appendix 2.

These interviews were supplemented by an e-mail based call for information that was sent out to over 100 e-commerce based retailers. The e-mail invited retailers to comment upon the issues raised, however this exercise did not generate a lot of useful data in the time available.

1.4 Structure of the report

The rest of the report is divided into five chapters.

Chapter 2 outlines the current literary debates surrounding the possible impact of e-commerce on retailing and its associated supply chain. It concludes by considering the effects that these changes may have on the internal business functions conducted by retail organisations.

Chapter 3 examines in closer detail the relationship between changes to the ways in which e-retailers conduct business and the demands for skills and employment. This maps out the skills requirements of the retail industry and its key supply chain industries in the new business environment.

Chapter 4 considers the potential of e-retailing. It examines several different market growth scenarios and considers the impact that these scenarios would have on the industry's skills needs.

Chapter 5 examines the role of the educational system and vocationally based training in meeting the demand for skills.

Chapter 6 pulls together our conclusions and identifies areas for further research.

2. The Impact of Electronic Commerce

This chapter provides a review of the main issues concerning e-commerce that have been identified from existing literature. The chapter begins by outlining a working definition of e-commerce, and progresses to examine the drivers and barriers to its growth. The final two sections consider the impact that e-commerce and its application in retailing (henceforth described as e-retailing) is likely to have on the supply chain and the methods by which organisations conduct their business.

2.1 Defining e-commerce

The term e-commerce has been adopted loosely by commentators to convey a variety of meanings (OECD, 1997). A definition outlined by the Centre for Research on Innovation and Competition (CRIC) views e-commerce as:

> *'(the) purchases of goods, services or other financial transactions in which the interactive process is mediated by information or digital technology at both, locationally separate, ends of the interchange.'*
> (CRIC 1999a, p. 5)

In similarity to other authors, this definition recognises that e-commerce is a transaction process that not only incorporates actual trade between buyers and sellers, but also encompasses the processes that make such trade possible. These processes are generic to all forms of e-commerce and particularly apply to e-retailing. They can be sub-divided into a number of (not necessarily sequential) steps, involving:

- search for product (through digital technology)
- exposure to information on a product
- expression of interest on a product
- commitment to purchase
- taking delivery and payment.

The overall transactional framework, however, may also be considered in terms of processes within a supply chain, or a series of discrete business activities. We will return to these aspects of e-commerce later.

2.2 The drivers of e-commerce

Even though e-commerce has experienced rapid growth over the last four years, the market is still embryonic and its future remains uncertain. There are, however, a range of factors which are driving forward e-commerce activity, particularly in the business-to-consumer arena.

2.2.1 Expanding choice

In some sectors e-commerce has the potential to revolutionise the process of trade. The number of retailers accessible to consumers is no longer restricted by geographical distance or national boundaries. In many instances, the procedure of purchasing goods or services remains the same, irrespective of the location of the retailer (although there can be cultural or fiscal barriers to overcome in some instances). From the retailer's perspective, the ability to centralise distribution or develop new relationships with suppliers, enables them to offer a greater range of products. For example, the Internet based bookseller Amazon.com is able to offer over 2.5m book titles online, compared to a range of around 150,000 books available from a typical large traditional store (Margherio *et al.*, 1998).

Another recent example of where the transcendence of national boundaries has had implications on domestic competition can be found in the car industry. At the time of writing, several online companies aim to take advantage of the lower price European dealership networks to undercut the prices currently offered by traditional UK dealerships (BBC, 2000).

2.2.2 Reduced operating costs

Conducting business over the Internet can be substantially cheaper than traditional alternatives (Rosen and Howard, 2000). Online retailers can limit their operations to advertising, marketing, accounting functions, and the establishment of customer and supplier relations. These virtual traders may require fewer members of staff and less operational space and facilities than their bricks and mortar counterparts. In addition, unlike traditional stores, they are able to stay 'open' continuously. Evidence from the US suggests that current Internet consumers tend to purchase their goods during somewhat irregular hours; 40 per cent do so between 22.00 hrs and 10.00 hrs (OECD, 1999).

2.2.3 Improve the efficiency of transaction

Electronic commerce can improve the level of accuracy in businesses transactions. For example, Cisco found that their online ordering system cut the proportion of transactions that contained

errors from 25 per cent to two per cent (OECD, 1999). At a business-to-business level, e-commerce can also facilitate 'just-in-time' management and improve demand forecasts. Studies of the US auto market suggest e-commerce enabled savings of 20 per cent through reductions in inventory levels (Automotive Industry Automation Group). The potential to improve logistical efficiency at a business-to-business level may also encourage large organisations to force their suppliers to adopt e-commerce systems. In 1996, around 70 per cent of business-to-business EDI was estimated to be the result of organisations making it a specification in their contract (OECD, 1999).

2.2.4 Reduce cost of distribution

The cost of distributing goods sold over the Internet depends upon the nature of the items sold. Although this may be quite substantial with regards to physical goods, intangible products that can be distributed electronically may be sold at a much reduced cost. These products include books, music, financial services, software and travel. Table 2.1 highlights the relative costs of distributing travel, software and financial products through traditional, telephone and Internet-based channels in the United States. In each case, the cost of distribution over the Internet is considerably lower.

2.3 The brakes on e-commerce

Despite the benefits of electronic commerce, many commentators acknowledge that its continued success is contingent upon its ability to overcome a number of resource-based as well as psychological barriers.

2.3.1 Technological constraints

The growth of e-commerce will depend upon the further development of the infrastructure necessary to make such trade possible. From a consumer's perspective, the most fundamental barrier to e-commerce stems from a lack of access to the necessary

Table 2.1: Impact of e-commerce on distribution costs in the US, 1998 ($)

	Booking an airline ticket	Banking transaction	Software distribution
Traditional system	8.0	1.08	15.00
Telephone	—	0.54	5.00
Internet	1.0	0.13	0.20 to 0.50
Saving (%)	87	89	97 to 99

Source: Based on calculations reported in OECD (1999)

media. The people in the UK that have regular access to personal computers and the Internet still represent a minority. Until the advent of 'free' Internet service provision the costs of subscription, together with telephone charges, made access prohibitively expensive for many potential Internet users. Competition between Internet service providers (ISPs) and, in particular, the introduction of free Internet access, has led to a steady growth in user numbers. However, the UK still lags behind the US when it comes to high speed data transfer.[1]

On the supply-side, the UK has experienced a continued expansion in the number of companies establishing Websites or selling online. In 1999 over half of all UK companies had an Internet presence, while nearly ten per cent were offering their products online. Although encouraging, the level of 'Information Communication Technology' (ICT) penetration still varies between firms of differing sizes (Spectrum Strategy Consultants, 1999).

2.3.2 Consumer resistance

Further barriers exist, even among those individuals who regularly use the Internet. These include fear of giving credit card details over the Internet, the inability to physically inspect the product before purchase, and a distrust of Internet-based companies' ability to deliver the service offered. These issues were echoed in a World Research Survey in which 21 per cent of respondents who had not brought online cited a fear of hackers as the reason, while another 12 per cent cited a distrust of Internet companies, and a fear that any goods purchased might not arrive. Additionally, the potential to abuse the information provided by individuals online, *eg* by using it for indiscriminate blanket e-mailing (spamming) was also recognised as a determent. In the same survey, 13 per cent of respondents said that they would not purchase goods over the Internet because they did not want to reveal personal information (OECD, 1999).

Lastly, shopping is often a social activity, carried out in groups. The isolation associated with online shopping could, therefore, make it a less satisfactory experience. The chairman of Amazon.com, Jeff Bezos, acknowledged this point when he suggested that, 'there is a need for public spaces where people can be entertained' (The Retail Maxim, 1999).

The experience of direct marketing in Europe suggests that the European consumer is less likely to take part in distance purchasing than their US counterpart. Indeed, the value of direct marketing sales in European is estimated to be less than half that of the US (Federation of European Direct Marketing and NTC Research Limited, 1997).

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[1] At the time of writing several Internet service providers are preparing to support ADSL as well as traditional 'copper wire' technology.

2.3.3 Business constraints

Retailers also have problems with adopting electronic commerce. The common concerns among organisations that trade or plan to trade on the Internet relate to the lack of corporate skills and resources, the need to alleviate consumer fears for security and privacy, the 'wrong' demographic mix among those with Internet access[1], and the problems of linking e-commerce to other business processes (Ernst & Young, 1999). Uncertainty as to how the market will develop may explain why in Europe 24 per cent of companies have taken a 'wait and see' approach to the development of e-commerce (Romtec EITO/DG3 study, 1998).

Skills deficits

The lack of people with relevant skills is an issue that has been raised in a study by Spectrum Strategy Consultants (1999). It found that in 1999, 40 per cent of companies in the UK felt that their employees did not have a sufficient understanding of ICT to maximise the company's competitive advantage. However, this was an improvement when compared to 52 per cent in 1997. The growth in confidence may partly be the result of more training. Perhaps in response to these concerns, the proportion of UK companies offering ICT training has increased from 65 per cent in 1997 to 73 per cent in 1999.

Interestingly, we found little else in the literature that specifically addresses skill issues.

2.4 Electronic commerce and the supply chain

The academic debate surrounding e-commerce has largely focused on the impact that it is likely to have on the relationship between buyers and sellers, and the role of intermediaries between consumers and producers (Steinfield C *et al.*, 2000).

2.4.1 Disintermediation

The early arguments suggested that e-commerce would change the cost structures that determine the relationship between producers and other businesses. These producers would find that through bypassing the supply chain intermediaries (wholesalers and retailers) they would be able to lower the overall costs of transactions and, in so doing, compete more effectively with traditional retailers. In its extreme, producers would become the

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[1] Those buying online tend to be young (64 per cent under the age of 40), male (69 per cent), with above average earnings and higher than average educational attainment (about one-third have post-graduate level qualifications) – figures from Ernst & Young (2000).

Table 2.2: Impact of intermediaries on costs in the shirt industry

Producer	Wholesaler	Retailer	Consumer
Producer's cost $20.45	Wholesaler's margin $11.36	Retailer's margin $20.91	Consumer pays $52.72
Producer's cost $20.45	No wholesaler	Retailer's margin $20.91	Consumer pays $41.34
Producer's cost $20.45	No wholesaler or retailer		Consumer pays $20.45

Source: based on Benjamin R and Wigand R (1995)

new retailers and retailers would no longer have a function. The process became known as 'disintermediation'.

At first sight, the economic incentives to disintermediate appear persuasive. Research based on the textiles sector has highlighted the cost reductions possible through eliminating different levels of intermediation.

Table 2.2 illustrates three alternative supply chain routes and the amount of 'value-added' that is passed on to the final consumer. The top row represents a traditional supply chain hierarchy in which goods are passed to consumers via retailers, wholesalers and producers. The second row represents a supply chain that bypasses the wholesaler, thereby offering a 28 per cent saving on the final product price. The last row represents a direct-to-consumer 'distintermediated' supply chain, in which the consumer saves 62 per cent on the final price of the product. In reality, the producer may decide to retain some of the margin and would still be in a position to compete against the traditional model. Although the above example focuses on the shirt industry, it is illustrative of the additional costs associated with intermediation. In most OECD countries the costs of intermediaries (transportation, wholesaling and retailing) constitute about one-third of the final price of goods (OECD, 1999).

2.4.2 Reintermediation

An alternative case has been forwarded by a number of authors (see, *inter alia*, Hawkins, 1998). They argue that although there are sectors (*eg* software distribution) where disintermediation may take place, the new technologies will create greater dependency on some intermediary functions, as well as give rise to new functions entirely. In other words, they will encourage a process of 'reintermediation'. The three functions that have been identified as being the most likely to benefit from e-commerce are advertising and branding, secure online payment (2.5.2) and delivery services (2.5.3).

One study of e-commerce concluded that there are at least four functions that are conducted by market intermediaries (Bailey J and Bakos Y, 1997):

- matching buyers and sellers
- aggregation of buyers and sellers
- agent of trust
- facilitation.

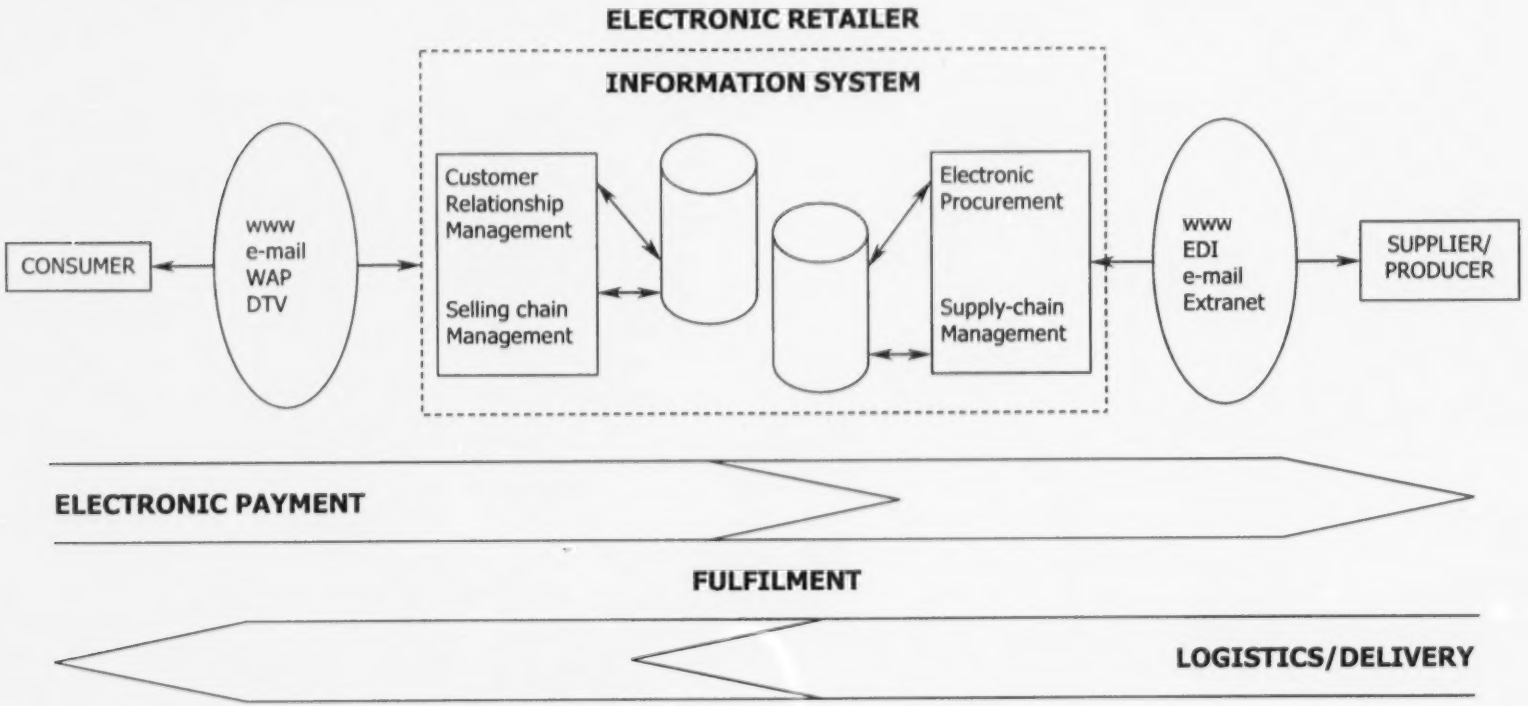
The opportunity to offer these intermediary services is central to the emergence of e-commerce based retail (or e-retailing) companies. Major retailers, through brand loyalty and their ability to pull together goods from a range of producers, are able to provide information to consumers that is both manageable and reliable. It may partly be for these reasons that sensitivity scenarios, conducted by the OECD on the US retail sector, concluded that the overall value of trade carried out via electronic commerce, without the aid of traditional distribution intermediaries (wholesaling and retailing), was likely to be similar to that currently being conducted in the US through direct marketing (OECD, 1999). Ultimately, the level of disintermediation resulting from e-commerce will depend on the nature of the products in question and the margins that producers may gain through selling direct.

2.5 Electronic commerce and business design

Although the above discussion highlights the inter-organisational implications of electronic commerce, it does not directly consider the impact that e-commerce will have on business design. There are at least two areas where e-commerce may affect the nature of demand for human resources. Firstly, the creation of any new e-commerce-based business will require generic skills that are generally associated with the processes of project development. Secondly, e-commerce may encourage the redesign of existing business functions, and the development of new business relationships, that are integrated through the use of information technology. These changes could influence employment, skills and job design. For example, when Cisco Systems introduced an online purchasing system, sales staff no longer spent time transcribing customer orders and were, therefore, able to spend more time engaged in selling and end-marketing (Kalakota R, Robinson M, 2000).

A 'functional model' of e-commerce is presented in Figure 2.1. It is not suggested that this represents a model of e-commerce that is common to all retailers. Rather, it is intended to provide some insight into supply chain relationships and the use of digital technology to manage the flows of information, products and payment.

Figure 2.1: Functional model of electronic commerce



Source: IES, 2000

2.5.1 Information system

The information system is built around a number of software applications that are designed to integrate a variety of internal and inter-organisational functions. At the start of the process, e-commerce allows the consumer to connect with the retailer across a variety of platforms (*eg* World Wide Web, WAP, Digital TV, e-mail). Taking the World Wide Web as an example, the interface (or 'front-end'/'gateway') between customer and retailer consists of a website. Behind the website (back-end), there are a number of applications that are designed to tailor the sales process (Selling-Chain applications) and to promote greater integration with marketing and customer service functions (Consumer Relationship Management applications). These systems may, among other things, assist in the management of product catalogues and allow for the 'personalisation' of marketing. They may also ensure that information remains consistent (integrated) across channels, *ie* between a 'bricks and mortar' shop front, their website, and their customer support call centre.

At the other end of the process, the availability of customer orders in digital form, and the need to match higher customer expectations with improved response times, could simulate electronic integration between retailers and their suppliers. Business-to-business interaction can be conducted through an array of platforms similar to those already mentioned (*eg* World Wide Web, e-mail, Electronic Data Interchange and Extranets). Supply Chain management applications[1] are used to co-ordinate the flow of information, goods and payment across the supply-chain, while Electronic Procurement enables organisations to streamline their business related purchases. A recent report (Ernst & Young, 2000) suggests that three-quarters of companies have integrated their back-end transaction systems (*eg* order management and billing) with their website. The report adds, however, that the level of sophistication with which they are integrated varies considerably. Start-up companies may have an advantage in that their system will be designed specifically for e-commerce and there is, therefore, no need to integrate it with an existing legacy network.

In terms of data management, there is a growing move among larger organisations towards consolidating data storage into single data-warehouses, which possess a software infrastructure necessary for processing raw data and data mining. Data mining software allows businesses to explore patterns or trends in sales data. For example, Tesco used data mining technology to explore the patterns of shopping conducted by customers using 'loyalty cards'.

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[1] For example, Bruce Lazare, VP of Marketing for Net Grocer, suggests that 'automating the warehouse is the major piece' of the organisation's cost-reduction strategy – quoted in Ernst & Young (2000).

Their analysis allowed them to calculate who the most profitable customers were, and how the stores could be stocked with their preferences in mind (*Performance and Innovation Unit Report*, 1999).

2.5.2 Secure online payment

In 1999 VISA international reported that the Internet was responsible for half of its credit card disputes, even though such transactions only constituted two per cent of overall business. The disputes largely revolved around charges for unordered goods, late delivery and additional charges. Internet fraud is still something that is relatively rare. Indeed, the level of credit card fraud carried out over the Internet has been estimated to be under one per cent, lower than that carried out through traditional means (Interactive Knowledge Online). But others believe that this figure will rise (UK National Criminal Intelligence Unit, 1998). In the light of these problems, the growth of electronic trade will require the establishment of secure and reliable payment systems.

Electronic commerce, unlike its traditional retail counterpart, involves an agreement to trade between two parties who are unlikely to ever meet. This physical, as well as psychological, distance between the buyers and sellers increases the need for mechanisms that build trust, or compensate for the existence of distrust. The establishment of trust is an impetus for advertisers and branding agencies, whilst compensation for distrust requires that the payment mechanism fulfils three criteria.

- First, the system needs to be **private**: for example, when financial details are provided over the digital network they should not be accessible by third parties.
- Second, the system requires **integrity:** buyers need to feel confident that when they agree to make a payment the vendor does not alter the level of that payment, while the vendor has to be able to confirm that the buyer has the means to make a payment.
- Third, the system has to confirm **authenticity:** it has to be able to confirm that the two parties are who they claim to be.

Several systems exist, or are being developed, to provide security across different layers of the Internet. For example, Microsoft and Netscape are producing software that allows consumers to use their web browsers to pay for products electronically. In addition, VISA and MasterCard are developing Secure Electronic Transaction to protect consumer credit details. More recently, a number of 'firewall' packages have been developed to protect business networks from unauthorised access. Ernst & Young estimate that the market for firewalls and encryption was $1 billion in 1996, but will rise to $5 billion by 2000.

2.5.3 Delivery system

Currently, levels of e-commerce have been highest among goods and services that require little in the way of physical delivery. Intangible products, such as music and computer software, can be distributed through the same medium by which they were purchased. However, with tangible products, the issue of delivery becomes more acute. Depending on the type of goods being sold and the proposition that is being offered by the vendor, there are several capacities in which e-commerce based delivery systems are likely to differ from their traditional counterparts. These capacities include:

- ability to make small, single order shipments to many customers, rather than to a few retailers
- immediate responsiveness, *ie* delivery can be made at a time convenient to the consumer, *ie* 24 hours a day, seven days a week (so-called 24 x 7) responsiveness
- ability to electronically track the progress of goods through the supply chain (online tracking)
- global coverage.

In their study of electronic commerce, Ernst & Young (2000) found that the majority (52 per cent) of companies use their own distribution centres for warehousing and delivery. The authors found that the delivery systems that companies adopted often reflected their heritage. A number of purely online companies had their own distribution systems in place, controlling most aspects of the logistical processes up to delivery. Delivery was often outsourced to organisations that specialise in global delivery services. Whether traditional 'bricks and mortar' companies established new systems, or relied upon existing networks, depended upon the level of spare capacity as well as the ability of the existing network to deal with single order shipments.

3. Electronic Retailing Functions and Skills

The last chapter summarised the literature on e-commerce in the way that it relates to retailing. In this chapter we draw on our interviews with a range of people involved in the provision of e-retailing, and focus on the key elements of the e-retail process and the skills needs that emerge at each point. Whilst there are overlaps with some issues discussed in the last chapter, the emphasis here is on the skills arising from the different functions identified.

3.1 The changing retail environment

A number of new developments have emerged from the introduction of online shopping:

- Retailers have been provided access to customers in different ways than they have ever used before, as a result of the advent of new access channels.
- It is now easier to sell things and the cost of entry to the sector has fallen. This is largely because of the fact that it is now easier to split the supply chain, with different companies responsible for, say, manufacture, warehousing and distribution.
- The third development is the emergence of new customers. It has been suggested that the best predictor of a current online user/shopper is his or her education level: better-educated people are more likely to be comfortable with computers, seek more information, and also earn more. The next growth wave of online shoppers is predicted to be more diverse: average and below average in education and income, and older (Ernst & Young, 2000); and most of the retailers we talked to were acting on this assumption.
- The fourth development, and flowing directly from these, is the emergence of new retail companies into the retail environment- the so-called '*dot coms*'[1]. The new entrants have shown that they can slot into the retail market, and although not dominating it, can cherry-pick those customers with a lot

[1] The new entrants are sometimes referred to as 'pure play e-tailers', without physical stores or shops.

of disposable income, and who are willing to buy anything. The new entrants can do so because new developments in the retail environment enable them to cut their costs, and to offer a unique service based on good marketing. Entrepreneurs who come up with good ideas can take them to the market very quickly. It is presaging a rate of change that represents the revolution in the retail industry.

- Lastly, and perhaps the most significant development, is the growing dependency on information technology (IT).

Rapid technological development in the IT industry has changed the way that retail strategies are implemented. In particular, there are new ways of holding and storing information. The people who are exploiting the new retail markets are actually doing so with immature technology. These are the ones who are prepared to make mistakes first, but also learn from such mistakes. Almost as important is the fact that the newcomers are also more ready to invest heavily in the new technology.[1] It is true that traditional retailers have invested a great deal in IT (*eg* service till systems, payroll, warehouse systems *etc.*). To a large extent, though, these are mature products. With a culture of buying mature technology, traditional retailers operating in this new environment face the dual problems of having to change fundamentally by investing in new, immature technology, whilst at the same time developing knowledge and expertise internally to implement the new IT.

While the new 'dot coms' seek to exploit the new technological and consumer environment, traditional retailers, according to our interview evidence appear to be developing an online presence for a number of reasons:

- *Defensive* – some are doing so mainly out of concern that they would lose out to their competitors if they do not do so. Retailers who take such a view regard an online presence mainly in terms of an additional revenue stream, rather than providing consumers with as many options as possible.
- *Strategic* –other retailers, on the other hand, are more sanguine, and see e-commerce as one of their top strategic business developments and an activity they must engage in if they are to stay in business over the medium to long-term period (*ie* over the next five years or so).
- *Holistic* – others still see additional benefits, prompting them to invest in the new technologies. For these retailers e-commerce embraces other opportunities: 'e-shop', allowing online shopping through new channels; 'e-business', enabling

[1] E-commerce consultants, Cap Gemini estimate that an average manufacturer spends about four per cent of turnover on IT, whilst traditional retailers may spend between two to three per cent. By contrast, the new players are spending up to eight per cent, or double that of traditional retailers.

them to streamline a number of business processes, better communications with external suppliers; and finally 'e-workplace', where the organisation can better communicate internally with its staff.

Whatever the motivation, it is increasingly being recognised that successful online retailing requires more detailed business and development planning, tailored specifically for the new retail environment. Indeed, what is clear from the experiences of 'dot coms' and traditional retailers alike, is that the basic business fundamentals do not change, and although the Internet has changed the way business is conducted, putting a bad business online will not turn it into a good one – it just becomes a bad online business.

3.2 Business planning and development strategy

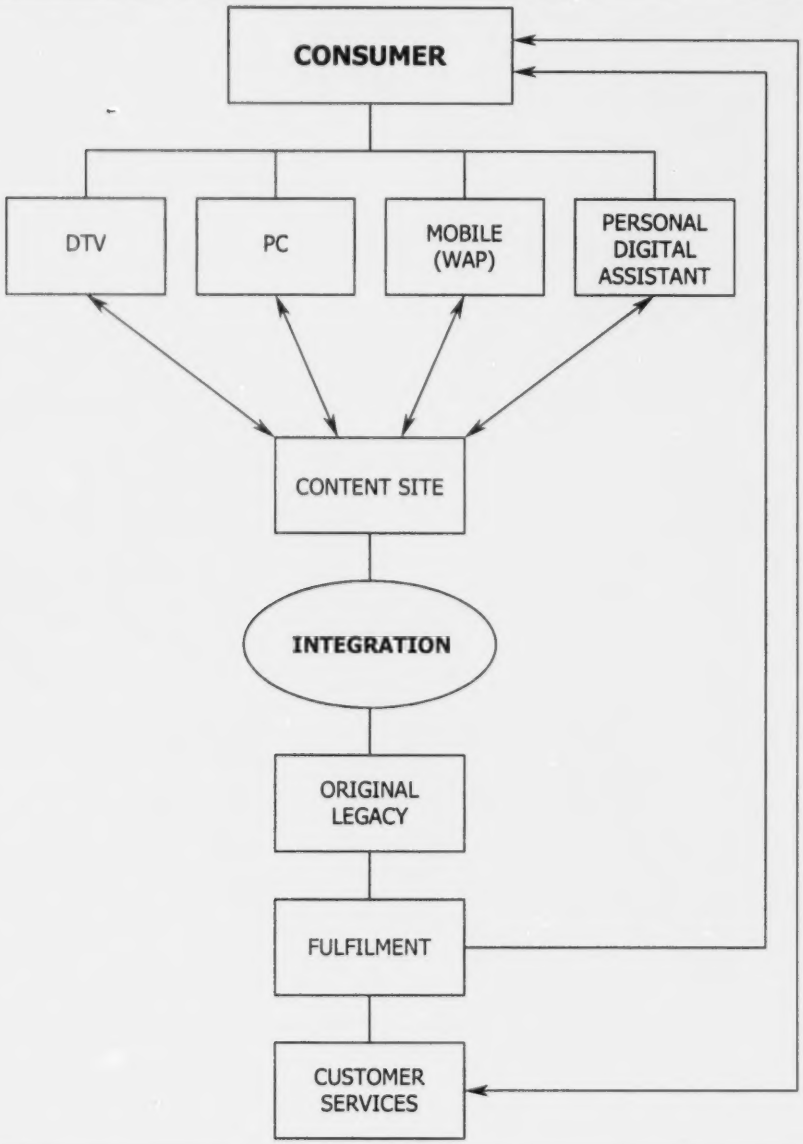
From our discussions with retailers and other key players, we have developed a model of the retail e-commerce process. Figure 3.1 is adapted from our earlier model (Figure 2.1 in Chapter 2), but also describes the functions involved in a way that disentangles the skills requirements of the different functions. The model describes the four main processes involved in providing the typical e-commerce solution – advice, design, build and run. At the head of the e-commerce process is advice, *ie* business planning and development.

3.2.1 Defining the customer proposition

The business planning process involves a number of steps. The starting point, and the business focus, is to define the 'customer proposition', *ie* what it is that the customer wants from online shopping, and what it is that the retailer can offer in response. Understanding the customer should be the number one priority of the online retailer. For example, the customer would want the experience of being able to buy a particular product, and at a time of his or her own choosing. How important it is for retailers to understand the consumer, as part of the business strategy, was explained by one of the respondents interviewed for this study as follows:

> *'We just can't go off into the Internet. There seems to be a lot of people who have gone wild for the Internet, and simply said "let's just put something out there". If that happens, that's where . . . "dot coms" have failed, because they haven't thought about the long term implications of what they are doing. They haven't understood their customer; and understanding the customer is more important than ever in the online environment, because there is no such thing as customer loyalty over the Internet. People can come to your site, if they don't like it, they go to another one. They don't have to get up and physically leave your store and walk to the next one. They just click a button and move on to a competitor's site. So you have to make sure you get it right, and you get it right first time.'*

Figure 3.1: The e-commerce planning process



Source: IES, 2000

The evidence from our interviews with retailers suggests that they are developing their online strategies with the customer in mind. The important point to note, though, is that online retailers do not form a homogeneous group. Consequently, the customer proposition differs for different types of retailers. For some, the advantage of e-retailing lies in the opportunity to offer 'range', *ie* to enter new markets by offering a wider choice of products (*eg* Amazon.com now offers not only books, but also music, health and technology-based products). For others, the customer proposition is defined by convenience, and is typified by the description provided by another of our respondents.

'We want to be there for our customers, wherever, whenever, however. And that is part of our distribution strategy, that if a customer walks into one of our high street shops we'll be there for them. If they want to call one of our call centres, we'll be there for them. If they want to look at and research their holiday over the Internet, we'll be there for them. If they actually want to book it over the Internet we have to be there, and if it is over interactive TV, again our brand will be there. So it's being there at every point of contact for our customers.'

The customer proposition is typically assessed through customer research; and among the questions retailers need to ask themselves in their assessment are: whether the customers they are aiming for are bargain hunters, *ie* people who will rummage around until they find a good bargain that they think nobody else has had; whether they are interested in just convenience, in which case they already know the products they are looking for and are, therefore, less attracted by bargains. Since online retailers have only a short amount of time to capture customers and keep them, they need to have in-depth knowledge of those customers.

3.2.2 Defining the medium for access

Just as important as assessing the customer proposition is how potential customers will reach e-retailers; in other words what kind of channels or platforms customers will use when shopping online. At the moment the majority of online shopping is carried out through the medium of the PC. This means that online sale is cross-related to the level of PC penetration and also to social class. However, the rapid pace of new technology development is making other suitable platforms available, and will also help increase access. For example, Wireless Application Protocol (WAP) now enables people using mobile handsets to access the Web (albeit in a limited way) and send e-mail. The third generation of mobile telecommunication now under development will provide mobile users with full interactive capability. The advent of digital broadcasting is also providing interactive communication via television sets; and the introduction of Digital TV will allow the provision of Internet access to the World Wide Web, including advertised sites. Importantly, the message and information presented must be consistent across all these channels, and must also be available around the clock (the so-called 24 x 7). Not surprisingly, the e-commerce strategy of some of the current e-retailers interviewed for this study is to become multi-channel providers, capable of giving customers the opportunity to buy what they want to, when they want, where they want, and how they want. They would like to be there at all times to provide the same, consistent, broad range of products.

3.2.3 Assessing project viability

Having defined the customer proposition and the medium of access, it is equally important for retailers to assess the viability of

the idea they have in mind. In other words they need to understand if it is feasible, and whether it will 'financially model'. They need to test the idea, sometimes almost to the level of a mathematical model, in order to understand the market.[1] At the same time there is a need to look at how the project will be funded. Funding is particularly critical for 'dot coms'. Online retailing may require considerable investment; and considerable skill to obtain that investment. Already, though, innovative ways of funding large-scale online projects are being developed, which make it relatively easier for start-ups to secure investment funds up front.

> Trainline, is a train booking service which has been developed for the Virgin Group. The whole of the project has been designed, built, and is run by a consortium made up of management consultants, e-commerce solution providers and investment banks. The consortium was not paid upfront to build the whole operation as a normal project would. Instead, it is paid a percentage of every ticket booked and purchased online.
>
> *Source:* Interview with Cap Gemini

In this example, as indeed with all new online projects, it is important that the prospective e-retailer works out both an operational model, to be tested to see if it works or not, as well as a payment model to estimate the returns on investment. These models must be firmly supported by market research and market-testing, about whether people will buy the new service or product. The question prospective e-retailers need to ask is, in popular parlance, *'will it fly?'*

3.2.4 The skills requirements for advice

It is immediately apparent that planning and developing the e-commerce strategy involves a multiplicity of skills. Three skills, in particular, are indispensable for this stage of the process.

First, planning an e-retail solution requires people with **in-depth knowledge of the retail industry**. But this must be underpinned by an understanding of the management of change, understanding of the implications of change, and the process and facilitation of that change. In other words, the principal skills requirement here combines knowledge of the demands of the business with a good understanding of what e-commerce can deliver; it is in more conceptual design and understanding of the new business processes, and how these can take advantage of e-

[1] It might be assumed that traditional retailers could eschew this stage of the process because they have established brand names. However, there is evidence that consumers are more discriminating when they shop online; and whereas they would, for example, take news from an established high street news organisation, they would not purchase financial advice from the same organisation.

commerce. This poses a greater challenge to traditional retailers seeking an online presence than for the new 'dot coms', as was explained by one of the respondents interviewed for this study:

> *'Traditional [retail] marketeers have an awful lot of experience and a lot of knowledge of their area of expertise which can be used to grow knowledge online. I just think that sometimes with traditional retailers they're, "Oh, we've always done it this way, why do we need to change?"; and I think when you're moving online, you need people who think more quickly, who are more adaptable to change, and who are not stuck in the ways of the business.'*

The head of e-commerce of a retail organisation described the importance of the new skills requirements:

> *'Our choice was based on* [name of consultant's] *knowledge of retail issues and practical understanding of what it took to develop an e-commerce response. As a first step [name of consultant] broke down our overall business into component parts to determine which of the constituent parts were likely to work online, and which would not. In addition they also assessed how the resultant strategy fitted our vision, and the timescale involved in developing the e-commerce response.'*

It is possible for online retailers to influence customer perception, first by creating a strong brand image and, subsequently, marketing that image through advertising. In online retailing, this is known as capturing a 'share of mind', *ie* how many of your customers are thinking of you first. For example, Amazon.com currently has the lion's 'share of mind' because even people who have never used the Internet know who Amazon are, and also that they sell books online. Establishing a strong brand name and image are a useful way of attracting online customers. This is particularly important because one of the key ways people access most retailers' sites is to enter 'www.*this is a name I know*.com'.

Secondly, **online marketing expertise** is an important skill requirement at the planning stage. Indeed, there is a lot more to online marketing compared with the direct marketing with which traditional retailers are accustomed. Online retailing is able to produce a wealth of information about customers that can be used to target marketing in a more effective and efficient way than direct marketing has allowed in the past. For example, direct marketing typically involves the collection and screening of information (or buying list) to target, say, specific income or post-code groups, who are then sent promotion material. By contrast, e-commerce enables e-retailers to monitor how people track through their sites, which sites they have visited before, or what they have previously purchased. With little or no customer loyalty online, prospective e-retailers who have not established a brand name, or are not as well known, need to target customers in order to attract them to their site. Success in attracting customers will depend, among other things, on online brand development skills, as well as online advert placement skills (*ie* which of the several web servers or portals, such as Yahoo!, AOL, Lycos *etc.* they use to

advertise their site). Online retailing, therefore, both requires and enables direct marketing to be personalised. In effect, online marketing skills are required to automate direct marketing activity to cover a wider population of customers.

Consequently, the third of the skills requirements for this stage of the process involves the ability to develop and manage complex databases, the **statistical analysis** skills needed to analyse vast amounts of data, and **modelling skills** needed to identify and forecast consumer needs and behaviour. Typically, one of the principal issues to address is estimating how much consumers would buy, and when they would buy. All retailers in the traditional environment do this, to some extent. In terms of skills needs, what is missing is (lack of) the experience necessary to translate what they do to the Internet environment.

From the foregoing, it can be surmised that the principal tasks facing prospective e-retailers when planning their online strategy are understanding the customer and getting the business models right first time. The skills implications are that they need people who are more focused on the customer and not just on the business process. They need people who have a very good understanding of retail and all that it involves. They need people who are quite open minded, and who are prepared to do things in a new way. In other words, e-retailers need people with the ability to think of issues from scratch instead of trying to optimise or adapt what already exists. The key skills are intellectual skills and the ability to manage change. For a sector which is steeped in tradition and is more used to certainty, the move into online retailing requires them to be tolerant of ambiguity. An important question arising from this analysis is whether retailers have the skills to carry out these tasks by themselves or whether they need support from external sources. We look at this issue later (in Section 3.5).

3.3 Systems design and operation

The interaction between online retailers and customers can be envisaged to comprise four elements:

- attraction
- conversion
- fulfilment, and
- retention.

The **attraction** stage is governed by marketing to establish the brand image, the so-called 'share of mind' to get people to the site. Once at the site, however, potential customers need to be persuaded to go beyond just looking at the front page, *ie* the home page. They must be attracted *into* the site, at which stage they become valuable visitors.

Once attracted into the site, they must be **converted** into purchasing customers. They need to be given the right products, the right prices and the right offers.

E-retailers then have to **fulfil** the requirements of customers. This includes the offer of payment methods that they can use and in a secure environment, recording the transaction and ensuring that their goods are delivered to them.

Once the goods are delivered, it is important to **retain** customers. To do so effectively requires addressing a number of important issues. For example, is there a returns policy? If they have problems, is there a customer service department to deal with them? It is important for e-retailers to maintain a database of a customer's name and address (including e-mail address) and the products they have bought, so there is information on what they are interested in to enable proactive targeting of special offers. In this way it is possible to personalise the service so that customers feel they are getting something that nobody else is.

The processes described are enabled and held in place by a number of complex systems which mimic the offline shopping experience. The design of these systems is the second stage of the e-commerce solutions. In simple terms, the design stage is concerned primarily with the technical details of what the business processes will look like, and covers the mechanisms by which the customer expresses an interest, selects, orders, pays for, and obtains the goods or services they require. There are issues to consider along the way, for example, whether to outsource some processes, such as logistics (warehousing, distribution and delivery). The functions necessary for the establishment and operation of these processes can be classified as:

- front-end design
- back-end design
- data warehousing and management
- customer resource management
- transaction management
- supply chain management
- fulfilment and logistics.

Although they can be considered separately, in practice the processes involved are inter-linked.

3.3.1 Front-end design

The 'front end' is the defining characteristic of online retailing, partly because that is what users see. The most visible of the design functions for this stage are presentation and channels

management. Presentation is what is commonly referred to as the 'website', what customers see when they use the e-retail interface, be it web-based PC, WAP-enabled mobile telephone, Digital TV or other platforms, and how these are formatted. At the same time the use of multiple platforms requires channel integration; in other words sending out consistent information to different platforms. It is usual for the two to be linked together by a product (or technology) that presents the same information in multiple formats, but which also obviates the need to reformat the information. There is often some **business logic** behind the sequence of activities that make up presentation. So, for example, payment is taken when an online customer takes a particular action. At the same time, a system of security is set up, to check or verify the identity of the customer, and what they do at the site. As well, the system must ensure that financial transactions are handled at the appropriate time. Lastly, the system must enable information to be customised for each individual. 'Personalisation' or market profiling allows retailers to store large amounts of information about their online customers. The importance of personalisation for retailers is that for the first time, new technology has enabled a reversal of roles; from one in which the customer is king, to one in which the retailer is king. In other words, it is now possible for retailers to push information out to their customers.

If two people with different personal attributes or circumstances visit an online retailer's site at the same time, it is possible for them to see different information screens. Different financial information would be presented if one has a mortgage and the other does not. Quite different information would also be outputted if one was married, or had children, and the other did not. What is happening is that technology allows the online retailer to gather information about customers, predict their behaviour and preferences, and then push appropriate information back to them. Personalisation, therefore, presents unparalleled advantages to retailers who understand its potential.

Whether separate or linked, the information utilised is provided (and supported) by a content management system. This is the actual management of multiple information on product range, but with multiple representation, so that the same product can be featured as computer text, or streamed as video or audio.

For example, someone shopping for hi-fi online might want to see different picture profiles of the unit. They might also ask for some text about it to read; or request how it looks like, in the form of 3D spinning graphic; or it may be a two minute video clip on how to use, say, a remote control; or there could be an audio web file. Essentially, though, it demonstrates the extent to which different media are linked to the same item. However, the same customer, if using a mobile phone, cannot browse the 3D graphic or picture on the handset. The design must take all

these factors into consideration in order to make the same content available.

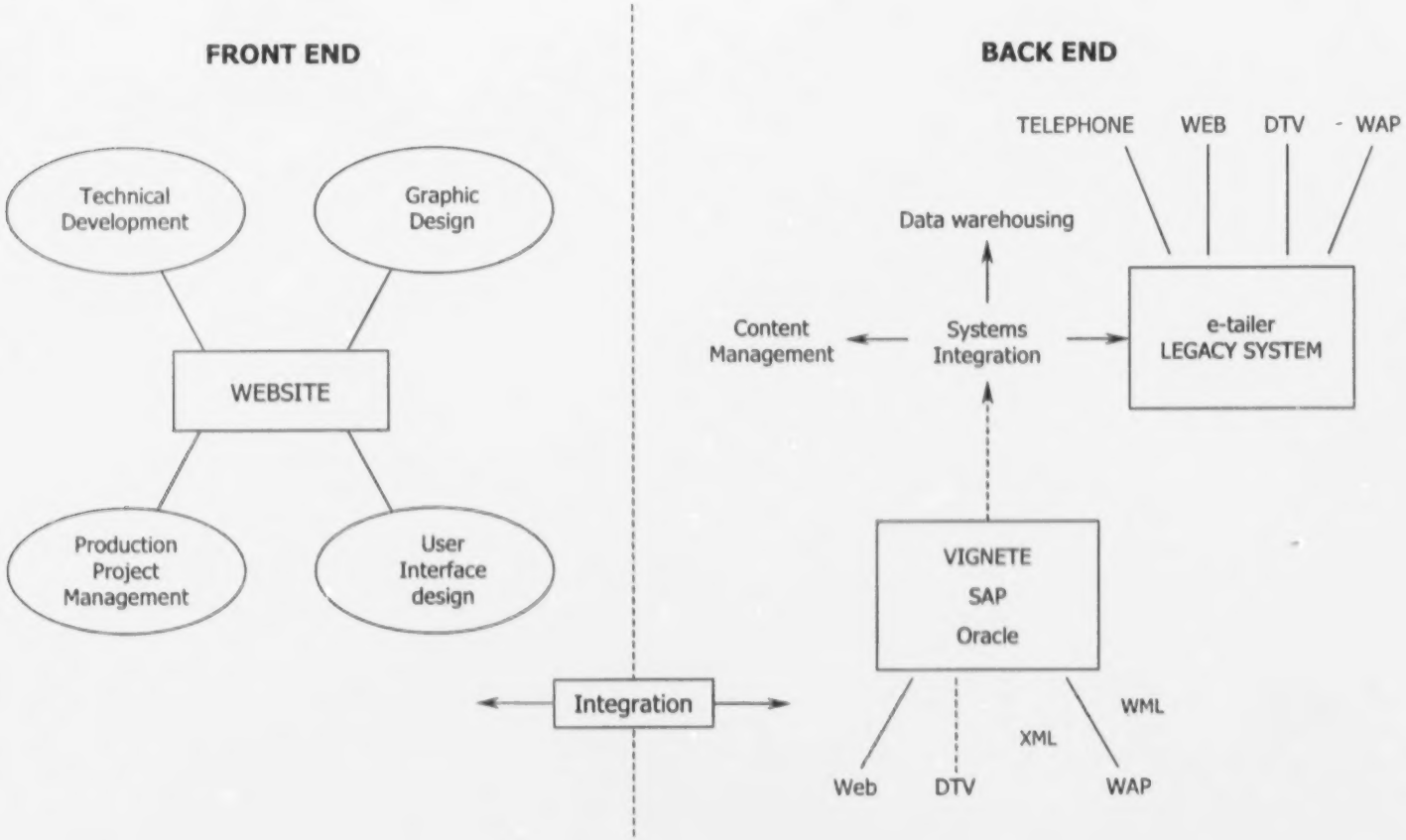
Front-end design skills

The skills required in the design of the front end, can be considered to be those concerned with the interface between users and the technology which supports how information is presented. Presentation and channel integration, for example, would be undertaken by people who not only understand the products, but also how they should look on different platforms. The building process itself will be underpinned by business logic. Figure 3.2 shows the range of skills that emerge from the design of the front end, and how these relate to the design of the back end.

Four key skills groups have been identified to be essential in the design process:

- **Technical development skills** – these cover computer programming language, such as hyper text mark-up language (HTML) and its derivatives, such as SHTML and DHTML. Underlying the HTML is a range of other languages, including JAVA and C++. These are public domain languages, although in practice there is a range of proprietary variants. In addition, there must be in-depth knowledge of the platforms on which the scripted information is presented (*eg* Open, Oracle, Liberate); and importantly, an understanding of networks and the speed at which information travels along these (*ie* bandwidth).
- **User interface design skills** – these are used in the development of logical procedures for online users. The specific skills requirements include a background in Psychology and Artificial Intelligence. Even more important is an understanding of interaction between humans and computers (Human Computer Interface); understanding of multi-media technology; and understanding of interactive design.
- **Graphic design skills** – these are used in the creation of visuals. Graphic design requires technical ability first and foremost, including core design experience, such as printing and font design (typography), Flash and After-effects. But it is distinguishable from basic graphic design, because it incorporates an understanding of the technology over which it is deployed. Consequently, additional skills are needed, including knowledge of applications and software, such as Photoshop; understanding of branding; creativity, including understanding of spatial design. Lastly, there must be knowledge of, and understanding of the limitations of different platforms.

Figure 3.2: E-commerce design skills



Source: IES

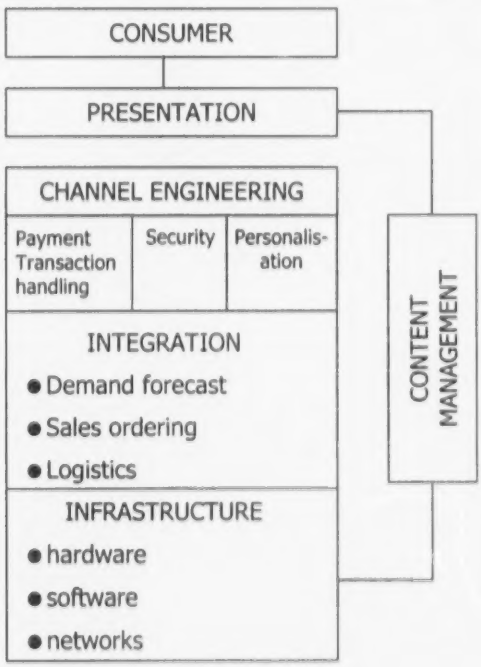
- **Production skills** – these are mainly project management skills. It requires competence in proposal writing to describe what the project is about; scheduling (*ie* drawing up a project plan); budgeting and accounting (*ie* project audit); people management and communication, with both clients and internal project team.

Ideally, people require an awareness of all these aspects of the work, and the ideal front-end design project team would incorporate people with a mix of design skills.

3.3.2 Back-end design

'Back-end' design covers the development of aspects of the online retail operation that the customer rarely sees, but which are vital to the online shopping process. It embraces both the IT and business processes which, together, deliver online fulfilment. In other words, it is about the manufacture, warehousing, distribution, and other services that are normally found in a retail environment. These activities are supported by a network of computer and other IT systems. The design of the back end must, therefore, be envisaged to involve aggregating large volumes of information from an array of supply functions, such as transaction handling and payment, online security and personalisation (Figure 3.3). The design of personalisation would be a discrete

Figure 3.3: Online retailing functions



Source:: IES

area by itself, whilst security often goes with transaction and payment.

Although it might be considered a paradox, the starting point for the design of the back end involves an assessment of existing IT systems. The fact is that existing retailers have invested vast amounts of resources in technology over the last 15 to 20 years, in order to get the right systems in place. These include IT systems to keep warehouses running, and in sales and other process systems. However, it is not always clear that retailers have an overall view or knowledge about how these function together, or the extent (details) of the type of information they hold, or how that information is manipulated. Moreover, these are systems that cannot be changed quickly, even though the pace of technological change itself is relentless. The existing systems were never, for example, designed to be 24 x 7; none of them linked to each other, none were automated, and nobody had responsibility to ensure it was end-to-end. Consequently, responsibility was limited to a particular system or environment (say, procurement or warehouse or payment) and was given up once it passed out of that particular system. The new retail environment, however, requires that systems are 24 x 7, they have to be fully automated, and have to be end-to-end, with no gaps; in other words with some technology or some person taking responsibility to ensure it is end-to-end.

The back-end design, therefore, largely involves database management and the ability to interface new e-retail systems with existing (legacy) computer based systems. These may also include the existing back office systems, such as those used for accounting, customer records, procurement and payment, and other HR functions. In terms of skills, these involve **systems analysis**, **database design** and **interface design**.

3.3.3 Data systems

As we have seen, online retailing is founded on the quality of information held on database. The development and design of information databases, therefore, provides the backbone of the online shopping experience. In terms of customer interface, the most vital database is that which provides 'content'. This is the information held by e-retailers not only on their products and services, but also about their brand, their values *etc.* Another element about content is actually what they hold on inventory and what they have on sale. Much of this information is produced or collected and held by online retailers themselves. However, they may also buy in other aspects of content. For example, online holiday companies are likely to buy information on resorts (from tourism agencies), destination (from airlines), online guide books, maps *etc.*

To a large extent most of these functions are carried out on existing systems, and by existing staff with retail know-how as part of their job. What is new to them, however, is the management of information, mainly because of the immense scale of what is produced. In the new retail environment, this requires an ability to sift through immense volumes of information, to carry out complex queries, and report these in a simple, yet coherent manner. The principal skills requirements here are those that deal with the **management and reporting of large scale information**.

3.3.4 Fulfilment and logistics

Fulfilment and logistics cover the process of getting the product from a wholesaler (or manufacturer) to the consumer; as well, it covers other processes such as the handling of customer after-sales service. At the more detailed level then, the fulfilment and logistics process can be considered to deal with the normal supply issues; such as buying, forecasting of buying intentions, manufacture, the placing of orders, storing the products, and distribution.

When considered separately, most of these activities around fulfilment are familiar to retailers, and are much the same as in traditional retailing because this aspect has never been customer-facing. However, although the process is the same, the parameters are different in the new retail environment, in terms of quantity (fewer goods and services), timescale (shorter delivery times) and location (home delivery). Even more important, fulfilment is around the clock. Consequently, online retailers must have systems in operational areas that can deal with the type of volumes generated by online shopping. As well, they must have people with different skills in fulfilment; for example, to deal with queries on telephone, but also to be able to help customers navigate through the web.

The main skill needs, identified in our interviews with e-retailers centred on:

- **logistics management** – people who can manage the delivery and after sales service to the customer and integrate it with the company systems and image
- **contract or partnership management** – if this element of the system is outsourced
- **customer service skills** – it was generally felt that the demand for customer service skills would increase as e-retailers sought to differentiate themselves and as consumer expectations grew. Thus, all those coming in contact with a customer (*eg* delivering an order, or dealing with a query about an order) would need the necessary communication

skills and appropriate attitudes to enhance and not detract from the overall service.

Supply chain management

The processes involved in the way retailers deal with their suppliers and partners have also been fundamentally altered in the new environment. Retailers have entered a world-wide retail exchange. This is an open forum where suppliers bid, through competitive tendering, to supply goods. Whilst this helps lower costs to retailers, it raises issues about contractual relationships with suppliers with strong brand presence in their own right. For example, what happens when such suppliers decide to establish an online retail presence themselves? At the same time, though, the new procurement arrangements also require technology that is able to aggregate a lot of information on products from a variety of sources. Not only that, but the different types of technology deployed by retailers and their supply chain partners must be able to deal with each other.

Skill needs here centre on **procurement and supply chain management**, allied with an understanding of modern ICT systems and the potential they have for re-engineering the supply process.

Customer relationship management

The development of online shopping has changed the relationship between retailers and their customers. In particular customers want an excellent service, but they also want it now. This requires that in some cases there are radical changes as to how online retailers fulfil, and how they handle customer service in an online world. Successful online fulfilment requires more knowledge and information about the customer. Consequently, part of the drive into e-commerce is also a drive into customer relationship management (CRM). The need for information can also flow the other way (*ie* customers also want more information), and calls for a different type of response than previously. For example, if customers send an e-mail, they would not want to wait 24 hours for a response; it should be forthcoming, almost straight away. This, in turn, means a lot of processes that were traditionally done manually as part of fulfilment have to be automated; from the time an enquiry is made about a product and an order is placed; through when the order is sent to a warehouse; when the sale is completed; when customer service kicks in if there is a problem; and when after sales service is required. What drives these processes is better information.

In terms of skills, those who deal with customers in the new environment require some basic technical skills. They need to be computer literate because they are going to deal with most queries online; they have to be comfortable with using a browser, for

example, if customers asked questions about how they navigate through the web to the e-retailer's site. For online retailers there is a training challenge to respond to this changed process, since it is not a core competency for the sector. It is also a different level of service, because retailers have to make sure they guarantee privacy and security, as well as all the other things that would make customers trust their brand and be more comfortable with shopping online.

3.4 Building and running the system

The build and run can be viewed as a combined process. They require, first of all, extensive knowledge of various technical products, such as software and hardware. The infrastructure at the heart of online retailing include a network of computers. Its importance cannot be underestimated; and significant effort is required to put together a world-wide system where, for example, a price change at one area is reflected across all the others. This requires effective synchronisation. However, building is also about the science of selling. Traditional retailers are used to organising their stores in particular ways, and generally follow product lines. The new retail environment, on the other hand, enables both selling (of specific lines) and cross-selling of related products; both of which require managing large volumes of information.

At the same time, building also involves establishing and defining contractual arrangements with external suppliers. The legal aspects of such arrangements are important, especially because there is not a great deal of knowledge of how e-retailing should operate outside geographical boundaries.

Once these arrangements are in place, the build involves physically implementing the IT, *ie* writing the codes (language), storing the code and other data, and testing the finished product. Testing is useful in identifying any glitches in the system; for example, how easy or difficult it is to get to the site, and how fast of slow access to product information is. Marketing is particularly needed as part of the testing process, to address issues of ease of access and speed of response of websites.

Building, therefore, breaks down into specialist areas: **IT specialist** skills are required to develop the business logic, build the networks, and pull the networks together; and **legal expertise** to help determine contractual arrangements.

Running the system is a question of maintenance, and requires mainly **project management skills**, together with good knowledge of retailing. In particular, superior project management skills are required where projects are more complex.

3.5 Interface and relationship management (integration)

It is clear that the new retail environment has brought about changes in the way retailers deal with their customers, and also with their suppliers. The effects of these changes are felt at two levels: those that obtain within the organisation itself (interface) and those that are external to the organisation (relationship). The way that these are managed also highlight the difficulties involved in finding a balance between the requirements of new (immature) IT and existing ones. To some extent, traditional retailers have several advantages compared with the new 'dot coms'; in particular, they have more of the controllable assets to deliver a service to customers. For example, trying to sort out a new warehousing structure can be very difficult (and expensive) for a 'dot com'; and it is sometimes not easy to buy such service and integrate it smoothly. By comparison, it is much easier for traditional retailers to use their existing infrastructure, and also to exploit their economies of scale. What they lack, however, are the interfaces between the different types of existing (legacy) technologies.

The missing link is provided through *integration* (see Figures 3.1 and 3.2). To a large extent, *integration* defines the new business model because it provides prospective online retailers with the tools (know-how) to link up their own systems, and then with their suppliers' in order to achieve fulfilment. What it does, in effect, is ensure that the 'back end' is fully automated, and also links up with the 'front end' at the same time (see Figures 2.1 and 3.3).

Integration is achieved through new *'integration technology'*, in the form of both hardware and software. It requires an **integration specialist** whose job is to design and build a new business process, and an information model to support that process. The aim of integration is to devise the best way of managing, extracting and passing information between the different units that make up existing technologies.

Integration specialists determine what type of technology can be used to manage the information flows in a seamless way. This means that they must understand their technologies and the methodologies in delivering e-retail solutions. Their approach to designing and implementing e-commerce solutions is different from the way that traditional legacy type applications were built in the past. In terms of skills they need an understanding of how to map business process information in technological terms, and an understanding of what the technology can and cannot do. Integration, not surprisingly therefore, requires and utilises different, but high level, IT skills. In particular, it requires extensive knowledge of the new breed of off-the-shelf software applications, such as SAP, which provide broad functionality and better integration with existing systems. However, the knowledge of integration specialists is not limited to software. They require, in addition, knowledge of the business; although more often than

not, they tend to work with people with inside knowledge of the organisation's fulfilment process, or their sales and purchase, and warehousing systems.

Equally important in the new retail environment is the link with their supply chain. This is particularly important for the new 'dot coms'. The following profile of a 'dot com' was provided by a respondent in an organisation which provides e-retail solutions, to illustrate the significance of integration with the supply chain.

> [*name of organisation*] have a good product, and they know what they're doing. They have spent a lot of time on their fulfilment — as much as they have on their 'front end'. So, they have a nice website; they have some good features to it, but also to their 'back end'. In terms of fulfilment, they've got a good way they can integrate with their suppliers. Part of their business model is to be able to offer to their suppliers what is almost like a 'universal translator' which they can plug into their system. This makes it easier for companies to do business with them. But it also gives them another advantage. It creates a barrier for other people to get into their market. The reason is that whilst actual websites at the 'front end' are not too difficult to build, integration into a supply chain is much harder.

3.6 The role of outsourcing

The design of an e-retail system requires a mixture of new skills and the transfer of old skills to a new environment. It can be surmised, from the earlier sections, that this calls for a balance of skills, and requires people who know the business, the existing (legacy) systems, and understand the business processes, but allied with e-commerce expertise. The overall aim is to radically alter the traditional processes. The surfeit of skills required for success raises an important issue; the extent to which the functional skills required are available in, or can be developed by, prospective online retailers themselves, or outsourced to external agencies.

Building and running an e-retail operation, therefore, requires people who know various products and have specialist technical skills, most of them IT-related. The overall design requires people with an overview and knowledge of the business, whilst building it requires experts in systems for security and payment, content management, business logic and building of networks (integration). There is no e-commerce expert who can build all these systems; they are specialist skills areas, and therefore require a team of such experts.

The evidence from our interviews suggest that online retailers do not have the majority of these skills and, therefore, outsource them to specialist agencies and consultants. Some do, as long as these are processes that do not differentiate them, *ie* do not give

them specific advantage. Moreover, it is not certain that prospective e-retailers can hope to recruit and retain people with all of those skills in-house. The fact is that people with these skills (*eg* web developers *etc.*) want to continually move on to the new products that are coming on the market. What retailers want is to have developed a product that they can maintain and keep relevant. But this is not what really good, young, ambitious web developers or IT integrators want; they would like to continuously move on to new technologies, or work in different disciplines or industries to gain new skills. In any case, some expert opinion suggests it is not possible to differentiate in the new technology, or on the web, for a continuous period of more than three to six months. Consequently, it may not be critical for e-retailers, for example, to develop high levels of expertise in-house. This suggests that at this stage retailers will continue to outsource the new skills, but continue to work closely with the suppliers of those skills. However, retailers must be cautious they do not become over-reliant on external sources of expertise. They need to develop in-house capability in some areas through skills transfer. This will enable their own systems analysts and other project managers develop valuable insights into e-commerce and how it can enable businesses to change.

4. The Skills Implications of E-retail

In the previous chapters we have identified the way in which electronic commerce could have an impact on the retailing process. However the full extent and nature of the impact will depend on the degree to which e-retailing grows as a form of distribution and/or takes over from conventional forms of retailing.

In this chapter we look briefly at what is known about the skill and employment breakdown of the retail sector and then, taking the skill needs identified in the previous chapter and likely growth scenarios for e-commerce, discuss how skill demand will change in the coming years.

Precise numbers are fairly scarce in the current literature and so at this stage we are only able to quantify changes in skill demand in general terms.

4.1 Employment in retail

Currently some 2.5 million people are employed in the retail trade[1], although numbers vary with the precise definition used. In addition, there are around 300,000 self-employed people and a further one million employees work in the related distribution and postal services sector. Although employment in retail has grown over the last five years (*ie* between 1995 and 1999) it has not expanded as fast as in the non-retail sectors of the economy. Employment, particularly among part-time and female staff, is expected to continue to rise on the back of growth in retail sales (Business Strategies, 2000), but only by around 0.6 per cent over the next five years, *ie* from 2.43 million to 2.52 million. Self-employment is forecast to fall by around two per cent over the period (from 330,000 to around 290,000).

The extent to which these forecasts take account of developments in e-retail is not clear, although they are discussed in general terms. Some forecasters predict massive employment impacts from the development of e-commerce. Spectrum Consultants, for

[1] As defined by SIC 52 retail and repair (but not motor vehicle). Source: Labour Force Surveys, Spring 1999, 1997 and 1995.

example, in a report for Arthur Anderson, suggest that the numbers employed in the 'Internet economy' in the UK will rise from 307,000 in 1999 to 852,000 in 2002. Not all will be employed in retail, as the definition of the Internet economy includes Internet service and network providers, software consultants and web designers. Furthermore, it is not clear whether this is a net or gross figure, *ie* whether it takes account of the jobs displaced in other sectors.

Most employees (70 per cent) currently employed in retail are in managerial and/or sales related occupations. Employment in higher level jobs (*ie* management, professional or technical – which includes ICT specialists) actually declined as a proportion of total retail employment between 1995 and 1999 (from 28.6 per cent to 28.1 per cent); whereas it rose (from 38.6 per cent to 40.6 per cent) in the rest of the economy. Employment in sales jobs is expected to grow over the next five years, reflecting continued emphasis on customer service (Business Strategies, 2000).

Skill levels, as measured by attainment of qualifications, have risen in recent years in line with other areas of employment, although employees in retail tend to be less qualified than average. For instance:

- the proportion of employees in retailing without a qualification fell from 25.6 per cent in 1995 to 19.4 per cent in 1999 (compared with a fall from 15.8 per cent to 11.5 per cent in other employment sectors)
- at the other end of the scale, 11.8 per cent of employees were qualified to at least NVQ Level 4 or equivalent (*ie* first degree level) in 1999, up from 9.8 per cent four years previously. By comparison, 30.3 per cent of other employees were qualified at that level, up from 26.6 per cent in 1995.

There is, therefore, no evidence from these data to suggest any relative upward movement in skill demand (or supply) in retailing.

Research for the Distributive NTO (Business Strategies, 2000) suggests that the level of training in the sector as a whole is low, and not particularly focused on qualifications. The NTO has identified three key skill areas for the next three to five years:

- customer service - identified as the single most important area of future skill demand in a recent employer survey for the National Retail Trades Council (cited in Business Strategies, 2000)
- management – including managers' ability to build and motivate effective teams and deliver higher levels of customer service

- IT – mainly to do with raising the computer literacy of all staff, but also to cope with some of the technical aspects of e-commerce.

Other research, on the other hand, suggests that the retail sector is currently not suffering any particular skill deficits, when compared with those experienced in other sectors. A recent major survey of skill deficiencies for the DfEE's Skills Unit (Bosworth *et al.*, 2000) suggests that retail is not much different than other sectors in reporting a high incidence of recruitment difficulties or skill shortages. The most commonly reported skill deficit was customer handling skills among sales staff.

4.2 Skill needs of e-retailing

In the previous chapter we identified a range of skill needs associated with the development of e-retailing. They can be summarised as follows:

4.2.1 Management skills

A number of management level skills were identified as being critical to the development of e-retailing. These included:

- project management – to manage the development of the whole or part of a new retailing system
- ICT management, and the linked skill of database management
- logistics management – to run the distribution and fulfilment aspects
- supply chain management – to run the procurement aspects
- contracting and partnership management – to manage the relationships with other organisations involved in delivering the e-retailing offer.

4.2.2 Technical skills

In addition to the management skills, there was a range of technical skills requirement, which tended to centre on ICT, including the ability to design, build and run the necessary systems.

Here the demand appeared to be threefold:

- People with the necessary depth (*eg* in computer languages, database construction or interactive design).
- People with the necessary breadth, to see and forge the links with other elements of the retailers' systems and provide and maintain integrated solutions.

- People with sufficient understanding of both retailing in general, and the organisational context within which they worked so as to be able to design and deliver appropriate solutions. In existing businesses this meant a knowledge of the prevailing organisational culture and processes. Where the function was outsourced, ICT staff needed an additional range of contract-related skills (*eg* developing a proposal, client relationship management *etc.*). These skill were not unique to contract staff, but perhaps needed to be more strongly developed.

Currently, we estimate on the basis of Labour Force Survey data, that some 0.6 per cent of employees in the retail sector are in IT-related jobs (*ie* there are around 20,000 computer systems managers, software engineers and computer analysts in the retail sector). We believe, however, that this is likely to be an under-estimate. This relative low figure is not that surprising, given the evidence we gathered from the interviews that many firms contract-out their IT function (although the larger retailers, who between them employ half the staff in the sector, are more likely to have in-house IT departments). Interestingly, the number of IT staff in retail has been growing rapidly in recent years, by 12 per cent between 1997 and 1999 compared with growth in total retail employment of 2.5 per cent. Around three per cent of all IT staff in the UK work in the retail sector.

The online retail sector is not unique in experiencing a growing demand for IT skills (Skills Task Force, 2000). Estimates of the growth in demand for IT employment vary considerably, *eg* between 25 and 50 per cent over the next three to five years (Mason, 1999, e-business.nto, 2000). Retailing will, therefore, be competing for staff with IT skills with a range of other sectors.

Other technical skills also identified in the course of this research included:

- On-line marketing skills – to exploit the customer information collected.
- Customer service skills – particularly at the fulfilment end, which could be the only physical contact between the customer and the retailer.

4.2.3 Generic skills

Underpinning the specific skill requirements described above were some general skill requirements at all points of the business. The words used to describe these skills varied, but our interviewees generally talked about two types of skill sets.

The first could be described as 'entrepreneurship' or 'thinking outside the box', and includes the ability to develop creative yet

practical solutions to problems, coupled with positive 'can do' attitudes and a high level of personal commitment.

To this can be coupled the need for greater levels of understanding at all levels about ICT and the potential it offers the retail industry. At the same time people with technical ICT and other skills were expected to have a much better broader understanding of business issues in general and those prevailing in retailing in particular. This was identified as an area of current deficit:

> *'There is a real lack of people who can combine ICT and business acumen.'*

4.2.4 Legacy skills

In the interviews, a few areas of current employment and skill demand were identified as those where demand could fall rather than rise in the future, depending on the rate of growth of e-commerce. These include:

- in-store sales staff – depending on the future development of High Street and out-of-town outlets
- in-store merchandising display staff – similar to above
- sales administration – where auto-replace stock control or ordering systems removed the need for more manual labour.

However, the pressure among conventional retailers to compete with e-retailers could lead to a growing demand for skills associated with customer service, to ensure that conventional retail, 'offers an enjoyable and worthwhile experience.'

4.3 The growth of e-retailing

In Chapter 2 we identified a number of factors which act to drive forward the growth of e-commerce by providing wider consumer choice; reducing operating costs; improving transaction efficiency; and reducing the cost of distribution of some goods. Other drivers include:

- availability of capital – currently online businesses are a favoured investment for venture capital (Rosen and Howard, 2000)
- technology – new digital technologies, particularly Digital TV, will potentially open up participation in e-retailing to a wider population.

At the same time there are a number of potentially constraining factors including, technological constraints, if growth in Internet use or Digital TV tails off or systems become unreliable; consumer resistance; and a lack of the skills needed by retailers to exploit the

opportunities offered by e-commerce. Further deterrents identified by Rosen and Howard (2000) include:

- the extent to which the costs of delivery, especially returns, can be brought down
- the ability of on-line retailers to achieve sufficient differentiation from their competitors to retain customer loyalty
- The speed of return on capital – *ie* the length of time capital markets will wait to see a return on their investment.

To an extent there could be multiplier effects at work. For example, the faster e-retailing takes off, the faster the technology and distribution costs will fall, the quicker the return on capital employed and the easier it will be for new retailers to enter or develop the market.

The ultimate growth and impact of e-retailing on the demand for skills and employment will be partly determined by the balance of the drivers over the brakes. The impact will also be influenced by the extent to which e-retailing becomes an additional form of distribution, or effectively becomes a substitute for existing forms. In the latter case, the jobs and skills gained in e-retailing will be counter-balanced by those lost in shop or traditional retailing. However, if e-retailing leads to an overall growth in retail sales and/or results in fewer job losses in conventional forms of retailing then the employment and skills effects may be greater.

4.3.1 Growth scenarios

Although it is impossible to predict where the balance will fall, a number of possible growth scenarios could be envisaged.

The recent Foresight Retail and Consumer Services Panel report (DTI, 2000) paints four possible growth scenarios for e-retailing over the next five years:

- **Explosive** – mass participation in e-commerce as widespread adoption of Digital TV opens up new products and services.
- **Dynamic** – high growth in consumer e-commerce as most conventional retailers switch to online media and those that do not struggle. However some social groups reject the trend, and the impact of Digital TV is mixed.
- **Active** – high but patchy growth of e-commerce, centred mostly on affluent consumers. Many consumers are not able to buy online as they reject digital technology on grounds of cost and/or principle. Only large and niche retailers successfully engage in e-retailing.

- **Sluggish** – low growth in e-commerce. Mass rejection of digital technologies, and skill and logistical constraints curtail e-retailing to a few niche areas.

The Institute for Retail Studies (Sparks, 1999) also foresees three slightly different ways forward:

- **Wired wonderland** – in which e-retailing is embraced 'in all its might' and socio-economic issues are resolved.
- **Social security** – in which the 'balances in social and economic futures are developed strongly and technology plays an important but not dominant role'.
- **Compound calamity** – in which tensions in society and economy have forced massive divisions between the haves and have-nots.

Where interviewees had developed their own scenarios they tended to fit, to a greater or lesser degree, the main options outlined above.

It is not our purpose here to develop these scenarios or to identify alternative future growth patterns. A distillation of this brief review of the futurology of e-retailing, however, suggests three core scenarios:

- **High, universal growth** – in which e-retailing fairly rapidly becomes an important and generally accepted distribution channel, resulting in a range of new 'dot com' retailers competing in both niche and general markets.
- **Medium, differentiated growth** – in which e-retailing is an important retail channel for some groups of the population, particularly the work-rich, time-poor, and technologically-literate, but is little used by other groups who are more disadvantaged by income, computer literacy or access.
- **Low, niche growth** – in which e-retailing is essentially a niche distribution channel, important only in a fairly narrow range of product markets (*eg* high margin, homogenous and easy-to-deliver goods) and a fairly narrow range of consumers. Conventional 'bricks and mortar' retailing is still the dominant form, with such retailers having an on-line presence mainly as a defensive ('me too') rather than aggressive strategy.

4.4 Future skill needs

The nature of the skill needs of e-retailing vary to an extent with the various growth scenarios, but not as much as both their incidence and their impact.

4.4.1 Low growth

Even under a low growth scenario, it can be expected that the demand for ICT skills will continue to outstrip supply. Our interviewees generally (but not universally) reported difficulty in attracting and retaining people with e-retailing ICT skills. As more conventional retailers look to move even defensively into e-retailing, and as new entrants continue to develop new opportunities, then demand for systems designers and operators will continue. The e-business.nto (2000) estimate that their side of the ICT industry will require at least 360,000 more staff over the next three years. Obviously not all of these will be required to work in or for the retail sector, but it is indicative of continued growth in demand even if e-retailing does not take off.

Using a simple extrapolation of recent growth in the number of IT professionals in the retail sector, and assuming the proportion of IT professionals in the sector remains the same, we estimate that the numbers of IT specialists employed directly in the sector will rise by 25 per cent over the next five years (to 2005), *ie* by a further 5,000.

Similarly there will be continued demand for the range of management skills identified earlier, particularly as it will be important to maximise profit in a poor situation for the sector. Under this scenario conventional retailers would be more likely to retain their e-retailing business within their organisational structure, rather than float them off. This will put pressures on human resource managers and others seeking to maintain organisational cohesion where the two sides of the business have very different cultures and pressure. Similarly ICT staff will need to be able to integrate new systems with existing ones in an efficient way.

Conventional retail 'legacy' skills deployed by shop staff will still be in demand.

4.4.2 Medium growth

Management and ICT skill needs are intensified as e-retailing becomes an important, if not universal, element of the retail scene and more companies (new and old) engage in the process. Therefore, further and wider gaps between supply and demand are likely to appear in both these skill sets. Demand for ICT skills is likely to be at the high end of the e-business.nto estimates, *ie* a further 800,000 required across the IT service sector.

Demand for IT staff within the sector will also rise steadily, *eg* by 50 per cent over the five year period, with a further net 10,000 professionals needed to be recruited.

Given the labour market pressures under this scenario as the use of IT in general becomes more prevalent, it is likely that the retail sector will become even more dependent on outsourcing their IT needs, with consequent implications for contract and project management skills.

Both managers and ICT staff will need to cope with consumers who do not engage with e-retailing. This will, for instance, place a greater premium on the ICT industry to cope with still widespread levels of computer illiteracy and phobia.

Under this scenario, small businesses in niche sectors find e-retailing attractive, and seek to acquire the necessary ICT and online marketing skills, mainly through outsourcing.

The level and volume of customer service skills required by e-retailers, particularly on the fulfilment side, is likely to rise as expectations among consumers attracted to e-retailing rise.

4.4.3 High growth

Under this scenario the growth in online shopping increases much faster than the growth in the number of e-retailers themselves. Growth is likely to be concentrated among late entrants (such as smaller retailers) where understanding of ICT and e-retailing is likely to be least developed.

Therefore, the demand for people to design and manage systems does not increase as fast as the demand for those to operate them. Consequently, we would expect particular growth in areas such as:

- customer support – *eg* handling problem orders and returns
- delivery – fulfilling order, although such growth will be limited by the extent to which the delivery infrastructure consolidates to meet the growth in demand.

Any growth in employment at this level is likely to be counter-balanced, at least to an extent, by job losses in conventional 'bricks and mortar' retail environments.

Demand for customer service skills continues to rise however, as it is likely that one of the key differentiators between e-retailers is the attention they give to this area of their business.

4.4.4 Conclusion

The main conclusions from this analysis are that as e-retailing grows as a proportion of total retail sales:

- demand for ICT and management skills rises rapidly, but begins to tail off under the high growth scenario as most

retailers develop new e-retailing systems – *ie* the key skills gaps are likely to be in the near-term rather than the long-term

- demand for lower level operational staff, (*eg* on the fulfilment side) rises as growth rates rise – *ie* any skill shortages in this area are likely to appear in the medium to longer-term
- under each scenario demand for customer service skills rises, although its precise character may change, and this is therefore both an immediate and future skills gap
- furthermore, under each scenario there is demand for widespread computer literacy, which may be hard to meet if the sector becomes more dependent on an ageing workforce
- conventional forecasts predict a slight rise in overall retail employment, *ie* around 50,000 people, although they may underestimate the impact of the development of e-commerce
- we estimate that the retail sector will have to recruit between 5,000 and 10,000 more specialist IT staff – approaching half as many again as are currently employed. In addition, under the higher growth scenarios, the sector will become even more dependent on external suppliers of IT services, generating a knock-on recruitment requirement. Although we are unable to estimate the proportion of the employment growth in the wider IT sector that can be attributed to e-retail, it is likely to be a significant element of the 350,000 to 800,000 people that are estimated to be required in the next five years.

5. Meeting the Demand — the Role of Education and Training

This chapter examines the role of education and training systems in meeting the demand for e-retail skills. As covered in Chapter 4, the nature and extent of future skills demands depends on the extent and nature of developments in e-commerce. However, it is possible to examine the current behaviour and plans of the key actors in the system as possible pointers to how future demand is likely to be met. The main actors are:

- employers
- software suppliers, and
- the education and training system.

It is important to make a few observations here about the demand for skills. First, it may be expected that differing levels of demand will in turn either make certain options more economic, or more necessary, while also changing the propensity of individuals and employers to obtain training to meet the demand for skills. For instance, a large increase in demand for e-retail skills will generate an increase in training provision in response; and similarly an increase in the provision of training places. Large numbers seeking e-retail skills will impact on the training system and, similarly, the provision of training places will encourage people to obtain the training. At the same time it should be realised that the retail sector is in competition with other sectors for many of the skills it needs to develop and establish an e-commerce presence. Therefore, the relative attractiveness of the sector is an important determinant of whether or not it is able to meet its skills requirements. It is equally important to note that e-retail developments are global, and the pace of development, in terms of both supply and demand elsewhere, will have a considerable impact on the situation in the UK.

Secondly, there are no agreed classifications of IT jobs and the skills that are required to undertake them, or the qualifications that are appropriate. This is part of the rationale for the drawing up of a National Information Systems Skills Framework by the IT National Training Organisation (ITNTO). It may be expected that

the Skills Framework for the Information Age (SFIA)[1] will assist future debate and analysis in the area.

Thirdly, there are problems due to overlapping definitions and statistical definitions which adequately describe or cover both the e-retail area and its related education and training systems. This makes a detailed examination of the statistics emanating from the training system difficult. Often, the existing data will be tangential and, therefore, open to debate.

However, this chapter draws on the available evidence to examine the responses of the main actors in the area.

5.1 The employer response

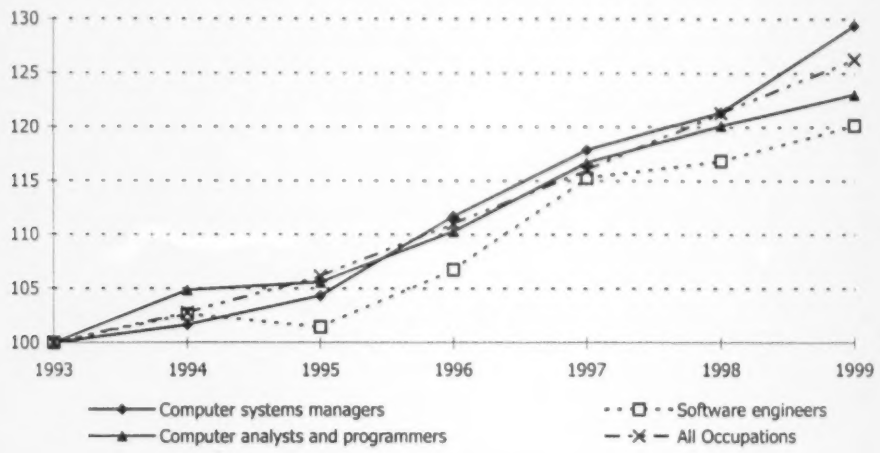
5.1.1 Rewards, pay and equity

The primary response by employers to the shortage of e-retail technical skills has been to offer higher salaries, increasingly use contractors, and to offer shares or share options to their skilled employees. This rapid growth in salaries has been concentrated in London, but evidence is emerging that partly in response to these high salaries, e-retail activity has started to diffuse out into other metropolitan areas. The high salaries on offer have also led to retention problems. In particular, retail organisations recruiting specialist IT staff to their operations face problems of salary comparability with existing non e-retail staff. In some cases this is creating considerable internal friction. Indeed, part of the rationale for outsourcing and the separation of the e-retail operation from existing brick and mortar retail, has been the desire to isolate the high e-retail salaries. Start-up e-tailers, who are unable to offer the high salaries that are demanded, are increasingly offering shares or share options to their employees. This is partly an alternative to paying salaries, but also to lock people into the future of the organisation and thus reduce turnover.

The salaries of IT workers are difficult to track using official statistics, mainly because of the large numbers of self-employed and contract workers in this occupational area. Notwithstanding the limitations of the New Earnings Survey (NES), which only covers employees and thus excludes important elements of the IT workforce, the NES still remains a useful source of information on relative salary levels. Importantly, when IT workers' average earnings are indexed alongside those for all employees this shows that earnings of IT employees has pretty well tracked those for all employees (Figure 5.1). If anything, software engineers have dropped back slightly and computer system managers have gained slightly. Otherwise the parallels are very strong. Of course

[1] ITNTO (2000), 'Skills Framework for the Information Age: Tracking the skills for prosperity', www.sfia.org.uk

Figure 5.1: Average gross weekly earnings* of all employees and IT employees (indexed to 100 in 1993)



Note * for those on adult rates whose earnings have not been affected by absence

Source: ONS (various years) New Earnings Survey Part A Streamlined Analysis

this need not conflict with reports of high e-retail IT salaries, given that the NES data does not yet cover the year 2000 and does not cover contractors, consultants or the self-employed. In fact, it might provide supporting evidence for the extensive use of outsourcing as existing retail operations attempt to insulate their existing IT staff from the high salaries on offer.

5.1.2 Pattern of recruitment

Although companies are looking for e-retail technical skills and experience, they are also looking for other skills and competencies. They want people who are generally intelligent and can understand where their technical skills fit into the operations of the organisation. The culture of many of the e-retail operators is young and graduate-based; therefore much of their recruitment is of similar young graduates. A respondent recruiter interviewed for this study suggested that even with Sun Java certification it would be hard for an older non-graduate, or those without experience, to get well paid work. On the other hand, a 20 year old (non-graduate) with three years' experience of the e-retail environment would be able to attract a high salary; and so would a 21 year old graduate with three months experience.

Another feature of the new labour market is that individuals are obtaining new posts within days of becoming available. This means that many traditional recruitment practices, such as second interviews, are causing recruiters to miss potential talent.

5.1.3 Training and cross training

The two main programming languages, Microsoft's ASP and JAVA, are derived respectively from Visual Basic and C++. Therefore, many employers are recruiting those with these older skills and cross-training them. However, there appears to be a reluctance by employers to train, given that things are moving very fast and they could be training people in out-of-date skills, or training people who could move into more attractive posts elsewhere. The e-business.nto (2000) argues that employers could do more to provide skills training among existing employees, and that training programmes need to expand to incorporate business and communication skills, as well as an increased depth of technology skills.

However, training is one of the benefits looked for by potential recruits. This is because these individuals realise that, in the fast moving world of e-retail software standards, they can keep abreast of developments only through training.

Apart from the provision of training and share options, employers are using a range of non-salary benefits to both attract and retain key staff. These range from cars and workplace gyms, to fewer hierarchies and a more 'laid-back' atmosphere in the workplace.

5.2 The software supplier response

Software suppliers have developed software tools and applications designed to ease the process of developing e-retail, as well as developing a range of training courses and accreditation schemes to increase the skills of those working in the area.

5.2.1 Software tools and applications

Increasing demand and increasing costs of e-retail developments have led, and will increasingly lead, to the development of a range of software tools designed to reduce the dependence on skilled workers. Productivity tools and development environments are designed to increase the outputs of programmers and developers. These tools allow the same number of skilled workers to design and implement more e-retail solutions. At the same time, generic e-retail solutions are being offered which can be customised to meet the needs of small e-retailers. Oracle, whose database software underpins many e-retail systems, is offering to supply its software in exchange for equity in start-ups, rather than charging for it.

5.2.2 Proprietary training and accreditation

Large software suppliers such as Microsoft, Sun, Cisco and Oracle offer a range of training courses and certification schemes. These

Table 5.1: Number of Cisco Internetworking certified experts, by country

	Cisco Internetwork Certified Experts
US	2,238
Canada	143
UK	377
France	125
Germany	269
Belgium	151
World-wide	4,855

Source: CISCO (2000) http://www.cisco.com/warp/public/625/ccie/ccie-program/ccie_present.html

courses are very functional, in the sense that they train people to use specific proprietary software. The training focuses on the latest features and functionality of their software and not necessarily the underlying principles. The skills acquired cannot often, therefore, be applied universally, whilst the courses themselves usually assume a range of pre-existing IT skills. On the other hand, they are very up-to-date with suppliers, thus ensuring courses are available at the same time as the release of the latest software. Since most of the relevant software suppliers are US-based and the training material is initially provided in English, the UK has a significant linguistic advantage. This is reflected in the relative numbers undertaking and obtaining the Cisco Certified Internetwork Expert (CCIE) qualification, where the UK has far more experts than France or Germany, despite their similar population sizes (Table 5.1).

5.3 The training system response

5.3.1 The required level of training

The main recruitment criteria for e-retail staff are experience and a range of soft competencies such as team working, communication skills and interpersonal skills. As such, there is little reference to qualification levels in the recruitment literature. Where qualifications are mentioned these tend to be the software suppliers' certificates such as Sun Java Certification. Anecdotal evidence suggests that e-retail staff are more likely to be young graduates. The Labour Force Survey (LFS) provides data on the highest qualifications of a range of IT occupations. The LFS indicates that about 60 per cent of software engineers have at least a first degree qualification, and that just under half of computer analysts and programmers have similar level qualification (Table 5.2); about ten per cent of software engineers and 14 per cent of computer engineers and programmers have a sub-degree; but

Table 5.2: Qualification levels of IT occupations

	Computer system managers SOC 126		Software engineers SOC 214		Computer analysts and programmers SOC 320	
	(1,000's)	% of total	(1,000's)	% of total	(1,000's)	% of total
First degree and above	76	42.2	111	59.7	138	47.1
Sub-degree/NVQ Level 4	33	18.3	19	10.2	40	13.7
Other	71	39.4	56	30.1	115	39.2
Total	*180*	*100.0*	*186*	*100.0*	*293*	*100.0*

Source: Labour Force Survey Dec 1999 to Feb 2000

between 30 and 40 per cent have no formal post-school qualifications.

Since new entrants tend to be more qualified than existing staff, this suggests that the bulk of new entrants to these occupations are qualified to degree level. Increasingly, sub-degree level qualifications are used as entry qualifications to first degree courses and as such have a declining labour market importance. This means that the main entry qualification is likely to be first degree level.

The LFS also allows analysis of the subject of people's highest qualifications, as is shown in Table 5.3. The figures suggest that despite computer science being the largest single subject, the majority of those in IT occupations with first degree and higher qualification are qualified in other subjects. Despite this, computer science remains the core subject for increasing numbers of skilled IT new entrants. Given this importance of first degrees in the IT labour market, it is useful to examine the education system's output of computer science first degrees.

5.3.2 First degrees

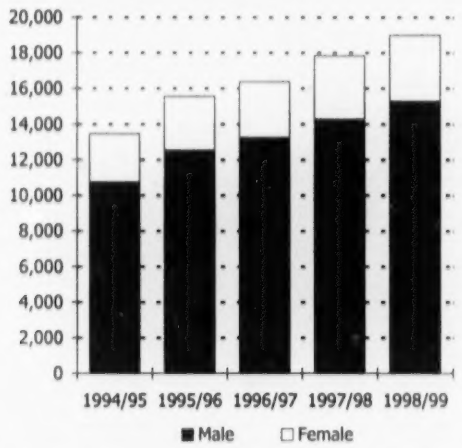
As already noted, the main relevant first degrees are the computer sciences. However, recruitment consultants and other respondents indicated that as long as people had acquired HTML or other e-retail experience, their degree subject was not completely relevant

Table 5.3: Computer science as the main subject of degree qualified IT workers

	Computer system managers SOC 126		Software engineers SOC 214		Computer analysts and programmers SOC 320	
	(1,000's)	%	(1,000's)	%	(1,000's)	%
Computer science	17	22.4	44	39.6	60	43.5
Other subjects	59	77.6	67	60.4	77	55.8
Base	*76*	*100.0*	*111*	*100.0*	*138*	*100.0*

Source: Labour Force Survey Dec 1999 to Feb 2000

Figure 5.2: UK first year, full-time, first degree computer science students, 1994/95 to 1998/99



Source: HESA (various years) Students in Higher Education Institutions

(see, for example, e-business.nto, 2000). In part this reflects the low level of e-retail content in current higher education courses.

The number of students starting full-time computer science courses at the first degree level has been rising steadily, from 13,470 in 1994/95 to 19,003 in 1998/99 – a 41 per cent increase (Figure 5.2). This is much faster than overall student numbers, which rose by about six per cent over the same period. Importantly, the proportion of women students remained fairly constant on computer science courses, while increasing from 48.8 per cent to 51.7 per cent overall.

An analysis of the 2,517 computing higher education courses and modules offered for entry in 2000 via UCAS (Universities and Colleges Admissions Service) indicates that only three modules involving computing and retail management in their title are offered; there are ten courses or module titles mentioning computing and marketing. In part, this reflects the relatively low profile of retail management studies within higher education. However, it also reflects the inevitable lags from skills needs being recognised to course provision and then entry into the UCAS system; which is in turn followed by a lag before students graduate from the courses. There is evidence of courses being planned to provide e-retail skills, but these will take time to produce the graduates for the labour market.

The pattern of first destinations of full-time computer science, first degree graduates is examined in Table 5.4. This shows that a declining proportion of computer science graduates is entering the wholesale and retail sector. It is only the rising numbers of computer science graduates that has led to an increase in recruitment by this sector. This suggests that the retail sector has become less attractive to computer science graduates.

Table 5.4: Sectoral pattern of first destinations of full-time first degree computer science graduates entering UK employment

	1994/95		1997/98	
	No.	%	No.	%
Manufacturing	543	17.8	691	12.9
Wholesale & retail trade/repair of motor vehicles, motorcycles & personal & household goods	170	5.6	249	4.6
Financial activities	265	8.7	431	8.0
Property development, renting, business & research activities	1,380	45.2	2,726	50.8
All sectors	*3,055*	*100.0*	*5,365*	*100.0*

Source: HESA (various years) First Destinations of Graduates Leaving UK Higher Education Institutions

The recent *Stevens Report* from the DfEE's Skills Task Force (DfEE, 1999) identified various ways in which bridges could be built between education (including higher education) and industry, to address skill needs.

5.3.3 National training organisations

National Training Organisations (NTOs) have the responsibility for articulating sectoral skills requirements and encouraging the development of appropriate training programmes. Part of the problem for e-retail is that it falls between NTOs – the ITNTO and the e-business NTO, although these bodies merged in July 2000. Additionally, the NTO tele.com covers the telecommunications aspects of e-retail, whilst the Distributive NTO (DNTO) covers the logistics aspects. The proliferation of NTOs, each with an interest in the e-retail sector, reflects the way the sector straddles existing institutional and statistical boundaries. Extensive collaboration between them is, therefore, required to maximise the effectiveness of the training response to current and future demand for skills.

ITNTO, as already mentioned, has developed the Skills Framework for the Information Age (SFIA), which provides a detailed framework of IT related functions, job titles and required competencies. It is intended that this framework will provide a coherent basis for analysis of skills requirements and supply in the IT sector. This means that once its use becomes widespread in IT labour market analyses, this framework will allow more detailed analysis of IT skills.

The ITNTO has also examined how software supplier certification courses can be integrated into the UK qualification system. Responding to criticism of their specific functionality, the ITNTO has developed parallel modules which concentrate on both soft skills and the more general IT underpinning knowledge. Apart from the educational advantages of incorporating these courses into the NVQ framework, another advantage is that the courses

will then attract FEFC (Further Education Funding Council[1]) funding. The lack of FEFC funding has acted as a deterrent to colleges providing these courses as, apart from the need to have the latest hardware and software, the full costs have to be passed on to the students. Some higher education establishments are also attempting to integrate software suppler certificates, with Sun Java certification now being offered as a component part of a Masters level qualification. The e-business.nto has, similarly, updated the National Vocational Qualifications on offer and has created better links with proven vendor qualifications.

[1] The FEFC is shortly to be replaced by the Learning and Skills Council.

6. Conclusions

There is no doubt that e-commerce has imposed new skills requirements on the retail sector. For the most part the initial stages of designing an online retail solution demand new skills at almost every level of the process, from business planning to fulfilment. The findings from this study suggest that while in their entirety skills pose problems for prospective online retailers, some of these are central (core) to the whole process, whilst others are more easily accommodated within the existing human resource structures of the retail industry.

In particular, the evidence suggests that online fulfilment, for example, is largely the same as traditional fulfilment, in terms of the skills requirements. Fulfilment is still based on the system that says that a store needs 'x' number of products because they have sold 'x' number of products. The fulfilment involves getting the products from the supplier to the warehouse, and from the warehouse to the store; there is very little difference that the store is a physical one or a web-based data site. The parameters have changed somewhat, but only to the extent that the quantities and timescale of delivery are different and that high levels of customer service are increasingly important. This also means that in terms of skills required by people working in warehouses or involved in delivering goods in the new retail environment, the changes are more incremental than fundamental.

It is true to say that some of the jobs might change, or even disappear altogether, either through disintermediation or because they can be more economically and efficiently outsourced to, say, just-in-time suppliers. In any case, online fulfilment has not been the first or sole catalyst for the invasion of technology into fulfilment and logistics. Warehouse operatives are used to being driven by a screen telling them when and where to carry out specific procedures. So, even though the business processes may have changed, they have the basic skills necessary to deal with the kind of technology and information emanating from online retailing. Of course, there are differences. The (shorter) time constraint represents a change. But even more importantly, those involved in warehousing and delivery have to become aware of what part they play in online fulfilment; so there is a level of ownership and responsibility to ensure the online retail process is end-to-end and provides the customer with the service they are

looking for. This though, perhaps represents more of a cultural rather than skills change. The only exception may be in the area of delivery and the extent to which customers require higher levels of service in terms of delivery times and product presentation.

Although the ageing working population may exacerbate the problem of computer literacy, we do not envisage that the sector will face insurmountable problems meeting these requirements, given a sufficient level of employer-based training.

At the other end of the scale, however, the new skills required are more fundamental; to the extent that e-retailers need either to develop the new business processes, and design and build the new systems themselves, or outsource these. In terms of those who carry out the actual functions, therefore, the choice is between upskilling existing staff and recruiting additional staff or reliance on external agencies and supply chains. By far the biggest issue that the retail sector faces in this new environment is that IT skills are critical to the whole online retailing process. By implication, the biggest problem the sector also faces is that there is a chronic shortage of high level IT skills in the UK. That shortage is reflected to a large extent by the very high salaries that integration specialists and good project managers command. Indeed, there are considerable financial rewards for graduates entering e-commerce, if they have the right computing skills. There are organisations willing to pay over the odds for graduates with no commercial experience. Some of the respondents we interviewed for this study suggested the average starting salary of an IT graduate joining a specialist e-commerce solution-provider is often upwards of £25,000 per annum; in addition there is a bonus of around 15 per cent of salary, as well as free shares or share options. Starting salaries of £40,000 or more are not unknown for computer science graduates joining consultancies in London. In the retail sector, by comparison, average salaries for new graduates range from £15,000 (for a floor section manager in a small store) to £20,000 for a floor section manager in a large store (IDS, Management Pay Review, May 2000). In terms of IT personnel generally, average salaries range from £24,000 for a programmer to £28,000 for a systems analyst (IDS, Management Pay Review, March 2000).

It is unlikely that in this type of climate, with demand far exceeding supply, the retail sector can successfully compete with the specialist agencies for people with high level IT skills.

So how would the retail sector address its skill needs if it is to continue to compete in the global market place? It is possible for the education system to increase the supply of skills; and it has done so by pushing out a lot of IT graduates, whilst school leavers have also become more IT literate because they have wider access to PCs. Indeed over a period of about a decade (from the mid-1980s), wages in the IT sector dropped because of the numbers of

IT graduates coming through the system with good, relevant skills. Those skills were particularly appropriate because the technology of the time had matured and stabilised, thus giving everybody, including retailers, time to build that skill resource. The present environment is dealing with lots of immature technology; and is, therefore, more chaotic and likely to be so for the next three to five years. This means that the technology market will remain immature whilst the education system continues to produce people who have good skills but are not immediately ready for the new technology. Consequently, it is likely there will be a continued skills shortage over the next three to five years. The analysis of the skills requirements of e-retailers shows that online shopping is generating *additional* demand for skills which cannot be met at the rate necessary for retailers and the associated supply chain to operate as world players in the global market place. This is exacerbated by a supply shortage which is already apparent in the UK. Research by IDC, for example, has suggested that the IT sector in the UK will need more than 80,000 networking staff by 2002 (IDC, 1998). A recent report by Spectrum Strategy Consultants for Andersen Consulting, has also noted that prior to the development of the Internet, there was no requirement for Java and HTML skills. However, traditional retailers seeking to develop an online presence now face the problem that they have to compete directly not only with organisations in other sectors, but also with Internet start-up companies, in seeking these skills (Andersen Consulting, 2000).

The fact is that technological development often occurs in cycles, in which periods of high intensity research and change are followed by periods of stability. The problem the education system faces is that it takes time to develop curricula and build courses. Consequently, education is often forced to play what amounts to 'catch up'. This in itself is not a bad thing, so long as the changes taking place in new technology are acknowledged and understood; for example, if there is greater awareness of the new programming languages, or aspects of integration technology. The onus is then on the IT industry, as a whole, to develop and provide training which would get people with a grounding in IT up to speed in the new technology.

In terms of addressing its skill needs in the new environment, the retail sector is faced with the problem that it does not have first call on people who have acquired the new skills. Consultancies and specialist suppliers can often pay higher premiums, in terms of salary, than the retail sector can afford, or is prepared to pay. The alternative is for the retail sector as a whole to have systems in place to anticipate important technology innovation themselves and, like all main IT-dependent industries, have training programmes in place to address the problem of likely shortages. It would mean retailers working more closely with universities and other educational institutions; sitting down with them and discussing where they see their businesses going, the skills that

would be required as a result, and how universities could be more specific with their skills output. This, in turn, calls for the retail sector to invest in higher and further education institutions, or in the education system in general. This may represent a cultural challenge to the retail sector.

So, what is the way forward for the UK online retailing in a fast moving world? Perhaps the most fundamental point to acknowledge is that e-business cannot take place without leaders who understand and are prepared to take risks about the rapid pace of development of immature technology in a chaotic world setting; and who can also motivate. The sector as a whole needs such leaders. But it must also be prepared to accept that quite often the destination of the new technology is not as clear-cut as some would like. The head of Andersen Consulting in London has highlighted the challenge to the leadership of the UK's business boardrooms in these terms:

> *'The new economy is really happening and it is changing what our clients are asking us to do. In the Boardroom, the greatest challenge is to understand that the rate of change is so fast that to do nothing is worse than almost anything else you could do.'*[1]

It is a challenge the retail sector must take up.

6.1 Further research

This study has identified the skill needs of the retail sector arising from the development of e-commerce. To the extent that the study was largely exploratory, its scope was necessarily limited. However, the study has identified several areas for further research, if a more comprehensive picture of the skills requirements of the retail sector is to emerge. We summarise these as follows:

- Although it was possible to map the skills required for e-commerce functions, it was not possible to quantify the skill needs across the sector as a whole. This will need to be a collaborative exercise by the NTOs with responsibility for the retail sector and its supply chain; in particular about how e-commerce is also impacting on the businesses of the associated supply industries.
- The development of e-commerce activities has concentrated so far on the interaction between retailers and their customers and, consequently, their new skill needs in the UK market. Needless to say, e-commerce is a global activity, and there is a need to look at the skills implications of operating in the global market place. It is possible to argue, for example, that any training which helps to define a customer proposition

[1] Quoted in the *Financial Times*, 19 January 2000.

must be combined with a clear understanding of commercial markets in other parts of the world.

- More qualitative work is needed to understand the key management skills required for successful participation in e-commerce; for example, about the career histories of current successful e-retail managers, and how they developed their skills.
- A more comprehensive assessment is required to understand the relationship between (higher) education supply of, and employer demand for, skills for the sector in the new electronic environment; what, for example, happens to all the relevantly qualified graduates, and why do they not seek career opportunities in retail?
- At a more fundamental level, education is the main means by which the IT skills shortage can be reversed. To some extent the introduction of Key Skills (IT in particular) is also contributing to the solution. It is not certain, however, that IT is given a high enough profile in the national curriculum. More particularly, it is not also certain that the importance of the Internet is readily acknowledged or demonstrated at successive stages of the education process (*ie* from primary school, through secondary school, to further and higher education). Nor, for that matter, is the extent to which basic familiarity with computers is a pre-requisite in the workplace. An important area for further research, therefore, is a study which will look at the extent to which these issues are addressed in the life stages of individuals.

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Appendix 2: Research Participants

We are extremely grateful to representatives from the following organisations who kindly agreed to be interviewed for this study:

Argos Ltd
Body Shop
Boots Interactive Ventures
Boston Consultancy Group
British Retail Institute
Cap Gemini
Computer Futures
Computer Horizons
Cranfield Supply Chain Knowledge Centre (Cranfield University)
Distributive NTO
e-business NTO
First Choice plc
First Tuesday
Ford College
Heriot-Watt University
Institute of Logistics
Institute of Retail Studies (Stirling University)
IT NTO
Kingfisher plc
Littlewoods
Modis International
Pathway IT Recruitment
Progressive Computers
QCA
Science Policy Research Unit (SPRU)
Spicers Ltd
Telewest
Tesco
Victoria Real